NOTICE OF AVAILABILITY

Draft Environmental Impact Report

DATE: October 16, 2020

TO: Responsible and Trustee Agencies, Interested Organizations, and Interested Parties

PROJECT: Kern Fan Groundwater Storage Project (SCH# 2020049019)

LEAD AGENCY: Groundwater Banking Joint Powers Authority (previously the Rosedale-Rio Bravo Water Storage District)

REVIEW PERIOD: October 16, 2020 to November 30, 2020

This Notice of Availability (NOA) has been prepared to notify responsible and trustee agencies, interested organizations, and interested parties that the Groundwater Banking Joint Powers Authority (Authority), as the Lead Agency pursuant to the California Environmental Quality Act (CEQA), has prepared a Draft Environmental Impact Report (Draft EIR) for the proposed Kern Fan Groundwater Storage Project (proposed project) that is available for review and comment. The Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) have formed the Authority for the purpose of developing, constructing and operating the proposed project. The Draft EIR was prepared to comply with CEQA and the *CEQA Guidelines* and to provide agencies and the public with information on the potential significant environmental impacts of the proposed project, recommended mitigation measures to reduce or avoid those environmental effects, and the analysis of alternatives to the proposed project. In addition, the Draft EIR was prepared in accordance with the CEQA-Plus requirements of the U.S. Environmental Protection Agency, to fulfill the requirement of potential federal funding partners to comply with the National Environmental Policy Act (NEPA).

PROJECT OVERVIEW AND LOCATION: The proposed project would allow the Authority to more effectively manage sources of water supply available to Rosedale and IRWD by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, the Authority would develop water recharge and recovery facilities in the Kern Fan area of Kern County, California (**Figure 1**). The proposed project would recharge, store, recover and deliver:

- State Water Project (SWP) water, including Article 21 water;
- Central Valley Project (CVP) water, including Section 215 water;
- Kern River water available to the Authority through agreement(s) with existing right holders; and
- Water from other sources when available.

The stored SWP water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial (M&I) uses in Rosedale's service area in Kern County and IRWD's service area in Orange County. A portion of the stored CVP water would be used to provide Incremental Level 4 supplies to federal wildlife refuges as well as supply reliability benefits to agricultural, and M&I uses. The proposed project would involve the construction and operation of water conveyance, recharge and recovery facilities. Constructed recharge basins, when inundated, would also provide intermittent wetland habitat to benefit local and migratory birds.

The proposed project would be located in western Kern County, west of the City of Bakersfield. The proposed recharge and recovery facilities would be constructed in two phases on approximately 1,300 acres of agricultural or vacant land within or near the Rosedale service area (Figure 1). The proposed project would also involve the acquisition of easements for construction, operation and maintenance of proposed Kern Fan Conveyance Facilities that would deliver water to and from the California Aqueduct and other facilities operated in Rosedale's Conjunctive Use Program.

ENVIRONMENTAL IMPACTS: The Draft EIR evaluates the potential impacts of the proposed project and, for identified significant impacts to aesthetics, agriculture and forestry, air quality, biological resources, cultural resources, geologic and paleontological resources, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, transportation, and wildfire, recommends mitigation measures that would reduce the potential significant impacts of the proposed project to a less than significant level. The proposed project could be located on a site, which is included on a list of hazardous materials sites compiled pursuant to *Government Code* Section 65962.5; however, the implementation of mitigation measures would reduce potentially significant impacts to less than significant levels.

DOCUMENT AVAILABILITY: The NOA and Draft EIR may be downloaded from the Rosedale and IRWD websites at the following locations:

- https://www.rrbwsd.com/newsletter-notices
- https://www.irwd.com/doing-business/environmental-documents

As permitted, printed copies of the Draft EIR may be available for public review at the following public libraries, as well as the Rosedale and IRWD offices, if/when the restrictions due to facility closures and the need for social distancing required in response to COVID-19 are lifted by the appropriate governmental agencies:

- Rosedale-Rio Bravo Water Storage District, 849 Allen Rd., Bakersfield CA 93314
- Irvine Ranch Water District, 15600 Sand Canyon Ave., Irvine CA 92618
- Beale Memorial Library, 701 Truxtun Avenue, Bakersfield CA 93301
- Irvine/Heritage Park Library, 14361 Yale Avenue, Irvine CA 92604

Members of the public who desire to review a printed copy should call (661) 589-6045 in advance to determine which of the above locations are open and, if not, whether other appropriate accommodations may be made.

PUBLIC INFORMATION PRESENTATION: During the 45-day public review period, the Authority will conduct a virtual meeting utilizing Zoom and telephonically to receive comments on the Draft EIR. The virtual meeting will describe the following: the proposed project; the contents and conclusions of this Draft EIR; and the key steps for the remainder of the public review process including the hearing on the proposed project before the Authority Board of Directors. The virtual meeting will be held at 2:00 P.M. on November 4, 2020 as follows:

Virtual Public Meeting Details

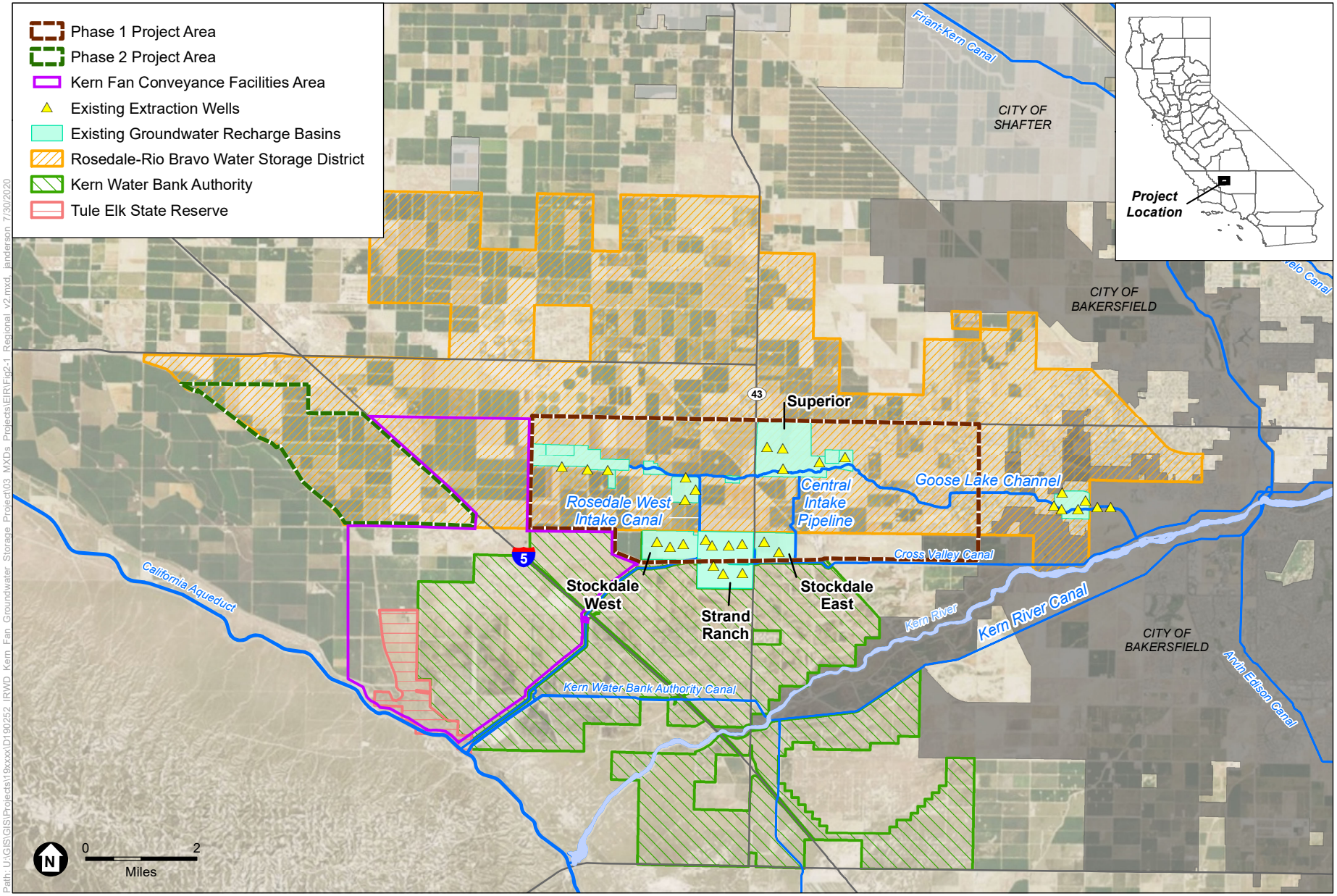
Date:	November 4, 2020
Time:	2:00 PM
Zoom:	http://bit.ly/kernfanmeeting
Telephone Dial-in:	(213) 338-8477 or (877) 853-5247
Meeting ID:	891 5693 0018
Submit Written Comments to:	Eric Averett General Manager Groundwater Banking Joint Powers Authority P.O. Box 20820, Bakersfield, CA 93390-0820 eaverett@rrbwsd.com

If participating online, please register for the meeting prior to joining by providing your name and email address. For the best experience it is recommended that you download and install Zoom on your computer before the meeting begins. The free Zoom software can be downloaded in advance, or at the moment you join the meeting at: https://zoom.us/download. However, it is not required to install the Zoom software on your computer to participate and provide comments. When you click on the meeting link provided at registration, a new browser tab or window will open (depending on your browser settings).

If participating by phone, you will not be able to see the visual content presented, but you can listen and participate. When instructed to do so, please press *6 to mute and unmute yourself, and press *9 to raise your hand.

PUBLIC REVIEW AND COMMENTS: The Authority is soliciting comments from the public regarding the content of the environmental information provided in the Draft EIR. Written comments on the Draft EIR must be received by the Authority at the address provided below, no later than 5:00 P.M. on November 30, 2020.

Groundwater Banking Joint Powers Authority
P.O. Box 20820
Bakersfield, CA 93390-0820
Attn: Eric Averett, General Manager
eaverett@rrbwsd.com



SOURCE: Mapbox; Kern County

Kern Fan Groundwater Storage Project

Figure 1

Regional Project Location

ESA

KERN FAN GROUNDWATER STORAGE PROJECT

Draft Environmental Impact Report
State Clearinghouse #2020049019

Prepared for
Groundwater Banking Joint Powers Authority:
Rosedale-Rio Bravo Water Storage District and
Irvine Ranch Water District

October 2020

ESA

KERN FAN GROUNDWATER STORAGE PROJECT

Draft Environmental Impact Report
State Clearinghouse #2020049019

Prepared for
Groundwater Banking Joint Powers Authority:
Rosedale-Rio Bravo Water Storage District and
Irvine Ranch Water District

October 2020

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Acronyms and Abbreviations

µ	micro
°F	degrees Fahrenheit
AB	Assembly Bill
AB 52	Assembly Bill 52
AB 2588	State Air Toxics Program
AADT	Annual Average Daily Traffic
ABAG	Association of Bay Area Governments
ACHP	Advisory Council on Historic Preservation
ACWA	Association of California Water Agencies
ADOE	Archaeological Determinations of Eligibility
ADT	Average Daily Traffic
AF	acre-feet
AFY	acre-feet per year
AIA	Air Impact Assessment
AHPA	Archaeological and Historic Preservation Act
ALUCP	Airport Land Use Compatibility Plan
amsl	above mean sea level
APE	Area of Potential Interest
AR4	IPCC's Fourth Assessment Report
AR5	IPCC's Fifth Assessment Report
ARB	Air Resources Board
ARMR	*Archaeological Resource Management Reports*
ASCE	American Society of Civil Engineers
ASTs	aboveground storage tanks
ATP	Active Transportation Plan
ATSFRR	Atchison, Topeka & Santa Fe Railroad
BAAQMD	Bay Area Air Quality Management District
BACM	Best Available Control Measure
BACT	Best Available Control Technology
BAU	business as usual
BERD	Built Environment Resources Directory
bgs	below ground surface
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
BRTR	Biological Resources Technical Report
CAA	Federal Clean Air Act
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
CAC	County Agricultural Commissioner
CA-FP	California Floristic Province
CAFÉ	Corporate Average Fuel Economy
Cal/OSHA	California Occupational Safety and Health Administration
CalARP	California Accidental Release Program
CalEEMod	California Emissions Estimator Model
CalGEM	California Geologic Energy Management
CalRecycle	California Department of Resource Recycling and Recovery
Caltrans	California Department of Transportation
Cal EPA	California Environmental Protection Agency

CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Office of Emergency Services
CAPCOA	California Air Pollution Officers Association
CARB	California Air Resources Board
CBC	California Building Code
CBRA	Coastal Barrier Resources Act
CBSC	California Building Standards Commission
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDHS	California Department of Health Services
CDPR	California Department of Pesticide Regulation
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CFS	cubic feet per second
CGS	California Geologic Survey
CH_4	methane
CHP	California Highway Patrol
CHRIS	California Historic Resources Information System
CI	*Coccidiodes immitis*
CMA	Congestion Management Agency
CMP	Congestion Management Plan
CNDDB	California Natural Diversity Data Base
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_{2e}	carbon dioxide equivalent
COG	Council of Governments
CPUC	California Public Utilities Commission
CRMMP	Cultural Resources Mitigation and Monitoring Program
CTR	California Toxics Rule
CUPA	Certified Unified Program Agency
CVC	Cross Valley Channel
CVP	Central Valley Project
CWA	Clean Water Act
CWC	California Water Commission
CWSC	California Water Service Company
CZMA	Coastal Zone Management Act
D	Desert
dB	decibels
dBA	"A-weighted" decibels
DBCP	1,2-dibromo-3-choloropropane
DMV	California Department of Motor Vehicles
DNL	Day-Night Average Sound Level
DOC	California Department of Conservation

DOGGR	Division of Oil, Gas, and Geothermal Resources
DPM	Delta Passage Model, diesel particulate matter
DPR	California Department of Parks and Recreation
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
E3	Energy + Environmental Economics
EDB	ethylene dibromide
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EMFAC	emissions factor model
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	U.S. Environmental Protection Agency
ESA	Environmental Science Associates, Federal Endangered Species Act
ESLs	Environmental Screening Levels
ESU	Evolutionary Significant Unit
Fed/OSHA	U.S. Department of Labor Occupational Safety and Health Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FESA	Federal Endangered Species Act
FHRP	Fire Hazard Reduction Plan
FHSZ	Fire Hazard Severity Zone
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FIWGEJ	Federal Interagency Working Group on Environmental Justice
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act
FR	Federal Register
FRAP	Fire Resource Assessment Program
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
FWS	Federal Fish and Wildlife Service
GAMAQI	*Guide for Assessing and Mitigating Air Quality Impacts*
GB	Great Basin
GDP	gross domestic product
GEM	Geologic Energy Management
GET	Golden Empire Transit
GHG	greenhouse gas
GPG	State General Plan Guidelines
GSP	Groundwater Sustainability Plan
GWh	gigawatt-hours
H_2S	Hydrogen Sulfide
HAP	Hazardous Air Pollutant
HCF	hydrofluorocarbon
HCP	Habitat Conservation Plan
HDPE	high-density polyethylene
HMAP	Hazardous Materials Area Plan
HMBP	Hazardous Materials Business Plan
hp	horsepower
HSC	California Health and Safety Code
HUD	U.S. Department of Housing and Urban Development

Hz	hertz
I-5	Interstate 5
ID	Irrigation District
IFI	Important Farmlands Inventory
IPCC	Intergovernmental Panel on Climate Change
IRWD	Irvine Ranch Water District
ISR	Indirect Source Review
KCFD	Kern County Fire Department
KCWA	Kern County Water Agency
Kern COG	Kern Council of Government
Kern OA	Kern Operational Area
KRT	Kern Regional Transit
KSA	Kern Sanitation Authority
KWB	Kern Water Bank
KWBA	Kern Water Bank Authority
kWh	kilowatt hours
L_{dn}	Day-Night Average Sound Level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level indicator
L_{min}	minimum instantaneous noise level indicator
LACM	Natural History Museum of Los Angeles County
LCFS	low-carbon fuel standard
LESA	Land Evaluation and Site Assessment
LOS	level of service
LPG	Liquid Propane Gas
LRA	Local Responsibility Area
LUST	Leaking Underground Storage Tank
MACT	Maximum Achievable Control Technology
MAFMC	Mid-Atlantic Fishery Management Council
M&I	municipal and industrial
MBHCP	Metropolitan Bakersfield Habitat Conservation Plan
MBTA	Migratory Birds Treaty Act
MCL	maximum contaminant level
MEI	Maximally Exposed Individual
mg/L	milligrams per liter
MMI	Modified Mercalli Intensity Scale
MMRP	Mitigation Monitoring and Reporting Program
MMT	million metric tons
MOU	Memoranda of Understanding
mph	miles per hour
MRZs	Mineral Resource Zones
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSAT	Mobile Source Air Toxic
msl	mean sea level
MT	metric tons
MUTCD	Manual on Uniform Traffic Control Devices
MW	megawatts
MWD	Metropolitan Water District of Southern California
MWDOC	Municipal Water District of Orange County
MWh	megawatt-hours
N_2O	nitrous dioxide

NAAQS	National Ambient Air Quality Standards
NAHC	California Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NECPA	National Energy Conservation Policy Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NIMS	National Incident Management System
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NOAA	National Oceanic Atmospheric Administration
NOD	Notice of Determination
NOP	Notice of Preparation
NORSD	North of River Sanitary District
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NPI	negative project impact
NRCS	Natural Resources Conservation Service
OEHHA	Office of Environmental Health Hazard Assessment
OPR	State Office of Planning and Research
OSHA	Occupational Safety and Health Administration
Pa	pascals
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PFCs	perfluorocarbons
PFRD/HPB	Public Facilities and Resources Department/ Harbors, Parks and Beaches
PGA	peak ground acceleration
PGE	Pacific Gas & Electric
PLCs	programmable logic controllers
PM	particulate matter
PM10	particulate matter less than 10 microns in diameter
PM2.5	particulate matter less than 2.5 microns in diameter
POM	polycyclic organic matter
PPA	Paul Pruett and Associates
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
PRMMP	Paleontological Resource Mitigation and Monitoring Plan
PUR	Pesticide Use Reporting
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gases
RPS	Renewables Portfolio Standard
RRBMA	Rosedale-Rio Bravo Management Area
RRBWSD	Rosedale-Rio Bravo Water Storage District
RSLs	Regional Screening Levels
RTP	Regional Transportation Program
RTP/SCS	Regional Transportation and Sustainable Communities Strategy
RWQCB	Regional Water Quality Control Board

SAFE	Safer Affordable Fuel-Efficient
SAR	IPCC's Second Assessment Report
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SB 1	Senate Bill 1
SCADA	Supervisory Control and Data Acquisition
SCAG	Southern California Association of Governments
SCAQMD	Southern California Air Quality Management District
SCEC	Southern California Earthquake Data Center
SCS	Sustainable Communities Strategy
ScV	Sacramento Valley
SDWA	Safe Drinking Water Act
SEMS	California's Standard Emergency Management System
SF_6	Sulfur Hexafluoride
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLF	Sacred Lands File
SLIC	spills, leaks, investigation and cleanup
SnJV	San Joaquin Valley
SO_2	sulfur dioxide
SO_4	sulfates
SO_4^{2-}	sulfates
SOC	Statement of Overriding Considerations
SOI	Sphere of Influence
SPRR	Southern Pacific Railroad
SR	State Route
SR-119	State Route 46
SR-43	State Route 43, Enos Lane
SR-58	State Route 58, Rosedale Highway
SRA	State Responsibility Area
SRF	State Revolving Fund
SSJVIC	Southern San Joaquin Valley Information Center
STIP	State Transportation Improvement Program
STLCs	Soluble Threshold Limit Concentrations
SVP	Society of Vertebrate Paleontology
SWANCC	*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*
SWIS	Solid Waste Information System
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TAO	Thermalito Afterbay Outlet
TCLPs	Toxic Characteristic Leaching Procedures
TCMs	transportation control measures
TDS	Total dissolved solids
TeNS	Technical Noise Supplement
THC	Thomas Harder & Co.
TMDL	Total Maximum Daily Load

tpy	tons per year
TRIP	Thomas Roads Improvement Program
TTLCs	Total Threshold Limit Concentrations
U.S.	United States
UCMP	University of California Museum of Paleontology
UIC	Underground Injection Control
UNFCCC	United Nations Framework Convention on Climate Change
USACE	United States Army Corps of Engineers
USBOR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USPS	United States Postal Service
UST	underground storage tank
UWMP	Urban Water Management Plan
VOC	volatile organic compounds
VMT	vehicle miles traveled
W	watts
WEAP	Worker Environmental Awareness Training
WellSTAR	Well Finder Online Mapping Application
Wh	watt-hours
WoUS	waters of the United States
WoS	waters of the State
WSD	Water Storage District
WSIP	Water Storage Investment Program
ZEV	zero emission vehicle

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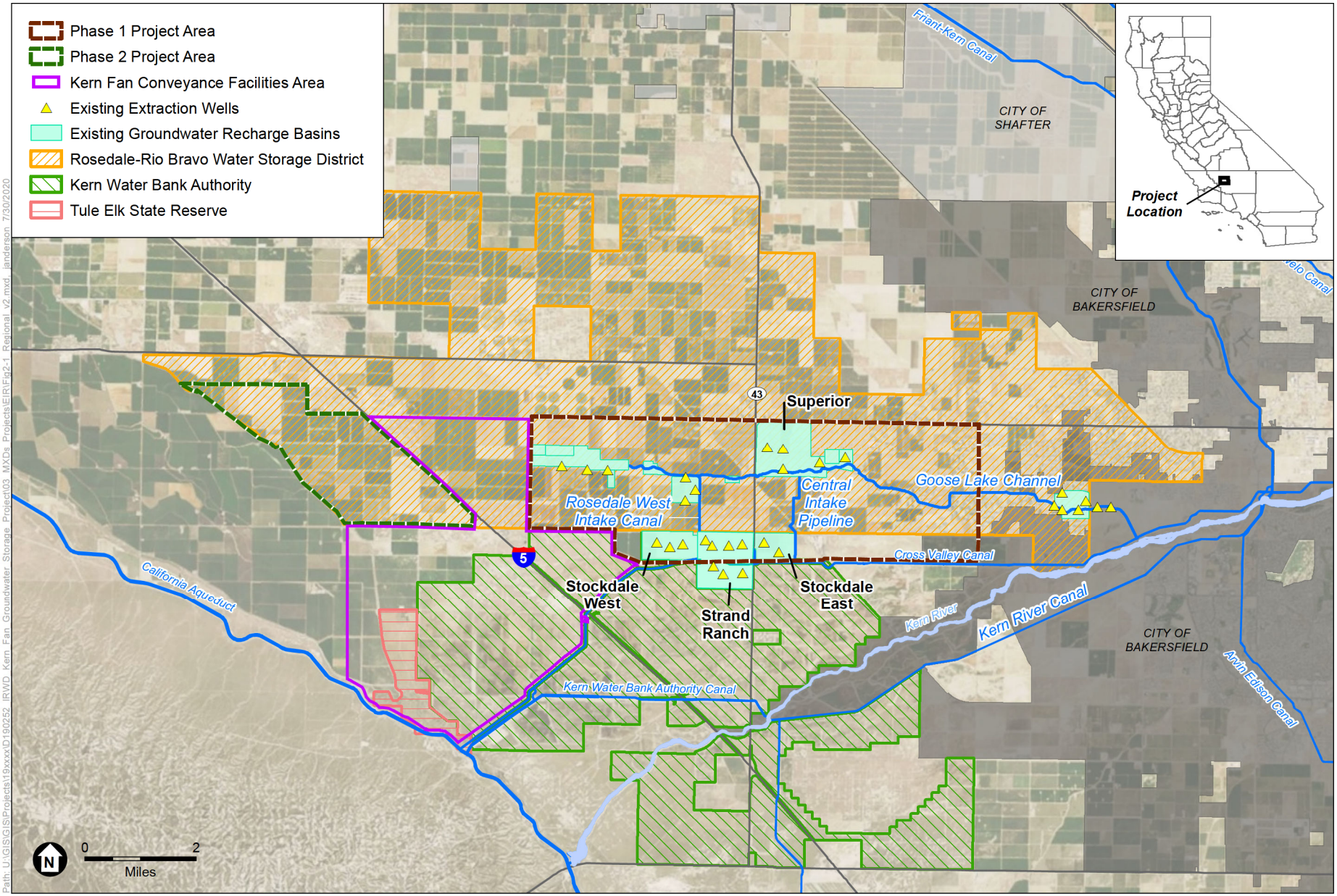
EXECUTIVE SUMMARY

ES.1 Introduction

Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) have formed the Groundwater Banking Joint Powers Authority (Authority) for the purpose of developing, constructing and operating the Kern Fan Groundwater Storage Project (proposed project) in western Kern County (refer to **Figure ES-1**). The proposed project would involve the construction and operation of water conveyance, recharge and recovery facilities (Figure ES-1). The proposed recharge and recovery facilities would be constructed in two phases on approximately 1,300 acres of agricultural or vacant land within or near the Rosedale service area. The proposed project would also involve the acquisition of easements for construction, operation and maintenance of proposed Kern Fan Conveyance Facilities that would deliver water to and from the California Aqueduct and other facilities operated in Rosedale's Conjunctive Use Program. Implementation of the proposed facilities would allow Rosedale and IRWD to more effectively manage sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin.

The Notice of Preparation for the proposed project's Environmental Impact Report explained that Rosedale would conduct California Environmental Quality Act (CEQA) review as the Lead Agency until Rosedale and IRWD formed a joint powers authority to complete CEQA review. The *Joint Powers Agreement Between Rosedale-Rio Bravo Water Storage District and Irvine Ranch Water District Creating the Groundwater Banking Joint Powers Authority to Develop and Administer a Kern Fan Groundwater Storage Project* (Joint Powers Agreement) became effective July 1, 2020. Pursuant to *CEQA Guidelines* Section 15051(d), the Authority has assumed the role of Lead Agency to complete CEQA review for the proposed project. Rosedale and IRWD are considered Responsible Agencies.

The Authority, as the Lead Agency, has prepared this Draft Environmental Impact Report (EIR) in compliance with CEQA of 1970 (as amended), codified at *California Public Resources Code* Sections 21000 et. seq., and the State *CEQA Guidelines* codified at Title 14, Division 6, Chapter 3 of the *California Code of Regulations*. The purpose of the Draft EIR is to provide the public and pertinent agencies with information about the potential effects on the local and regional environment associated with construction and operation of the proposed project. This Draft EIR describes the environmental impacts of the proposed project and suggests mitigation measures where necessary to avoid or reduce any significant impacts. The impact analyses are based on a variety of sources, including publicly available documents, agency consultation, technical studies and field surveys.



SOURCE: Mapbox; Kern County

Kern Fan Groundwater Storage Project

Figure ES-1

Regional Project Location

ESA

In addition, this Draft EIR has been prepared in accordance with the CEQA-Plus requirements of the U.S. Environmental Protection Agency, to fulfill the requirement of potential federal funding partners to comply with the National Environmental Policy Act (NEPA). Comments about the proposed project and this Draft EIR should be directed to:

Groundwater Banking Joint Powers Authority
P.O. Box 20820
Bakersfield, CA 93390-0820
Attn: Eric Averett, General Manager
eaverett@rrbwsd.com

ES.2 Project Background

ES.2.1 Rosedale-Rio Bravo Water Storage District

The water districts of Kern County are leaders in the development of groundwater banking programs in California. Portions of Kern County are characterized by hydrogeologic conditions that are particularly suitable for groundwater recharge operations. Kern County is also strategically located in central California near federal, State, and local water supply conveyance facilities. The groundwater banking programs of Kern County benefit local customers and water districts and also provide groundwater storage for districts in northern and southern California.

Rosedale is located west of Bakersfield and encompasses approximately 44,150 acres in Kern County, with 27,500 acres developed as irrigated agriculture and approximately 7,500 acres developed for urban uses (refer to **Figure ES-2**). Rosedale's service area overlies the Kern County Sub-basin ("sub-basin") of the larger San Joaquin Valley Groundwater Basin, and was established in 1959 to develop a groundwater recharge program to offset overdraft conditions in the underlying sub-basin. Prior to the groundwater recharge efforts initiated by Rosedale, groundwater levels in the District were declining at a rate of eight to ten feet per year. Through implementation of groundwater recharge programs and participation in the State Water Project (SWP), Rosedale slowed the decline in groundwater levels dramatically. In the mid-1990s, groundwater levels again were declining, and Rosedale initiated the Conjunctive Use Program.

Defining Conjunctive Use

"Conjunctive use" refers to coordinating the management of surface water and groundwater to improve the overall reliability of water supply. "Groundwater banking" is the practice of recharging specific amounts of water in a groundwater basin that can later be withdrawn and used by the entity that deposited the water. Groundwater banking uses underground aquifers for percolation and storage purposes, as an alternative to building aboveground storage, and offers water users both within and outside of the groundwater basin the opportunity to store water there. It allows flexibility to respond to seasonal and inter-annual variability, as water can be stored in wet periods, when water is abundant, for use in dry periods, when water may be in short supply. Groundwater banking programs may benefit water levels in the local aquifer because the amount

of water available for recovery is less than the amount recharged; this difference can help to mitigate existing overdraft conditions and raise groundwater levels.

Rosedale's Conjunctive Use Program

Rosedale's Conjunctive Use Program currently manages more than 500,000 acre-feet (AF) of stored water in the underlying sub-basin, which has an estimated total storage capacity in excess of 1.7 million AF. The Conjunctive Use Program encompasses a broad range of activities intended to benefit Rosedale and its landowners through better management of the groundwater resource, integrating and incorporating all of Rosedale's available facilities to this end.

Rosedale has groundwater banking agreements with several participants as part of the Conjunctive Use Program, under which all recharge must occur in advance of extraction. Water supplies for Rosedale's programs, including its Conjunctive Use Program, are provided by participating water agencies and include high-flow Kern River water and supplies from the Central Valley Project (CVP) and SWP. Currently, the infrastructure for Rosedale's programs includes over 2,000 acres of recharge basins and numerous recovery wells. The Conjunctive Use Program and other Rosedale programs provide a maximum annual recharge of 228,600 acre-feet per year (AFY), maximum annual recovery of 89,500 AFY, and underground storage of approximately 1,700,000 AF.

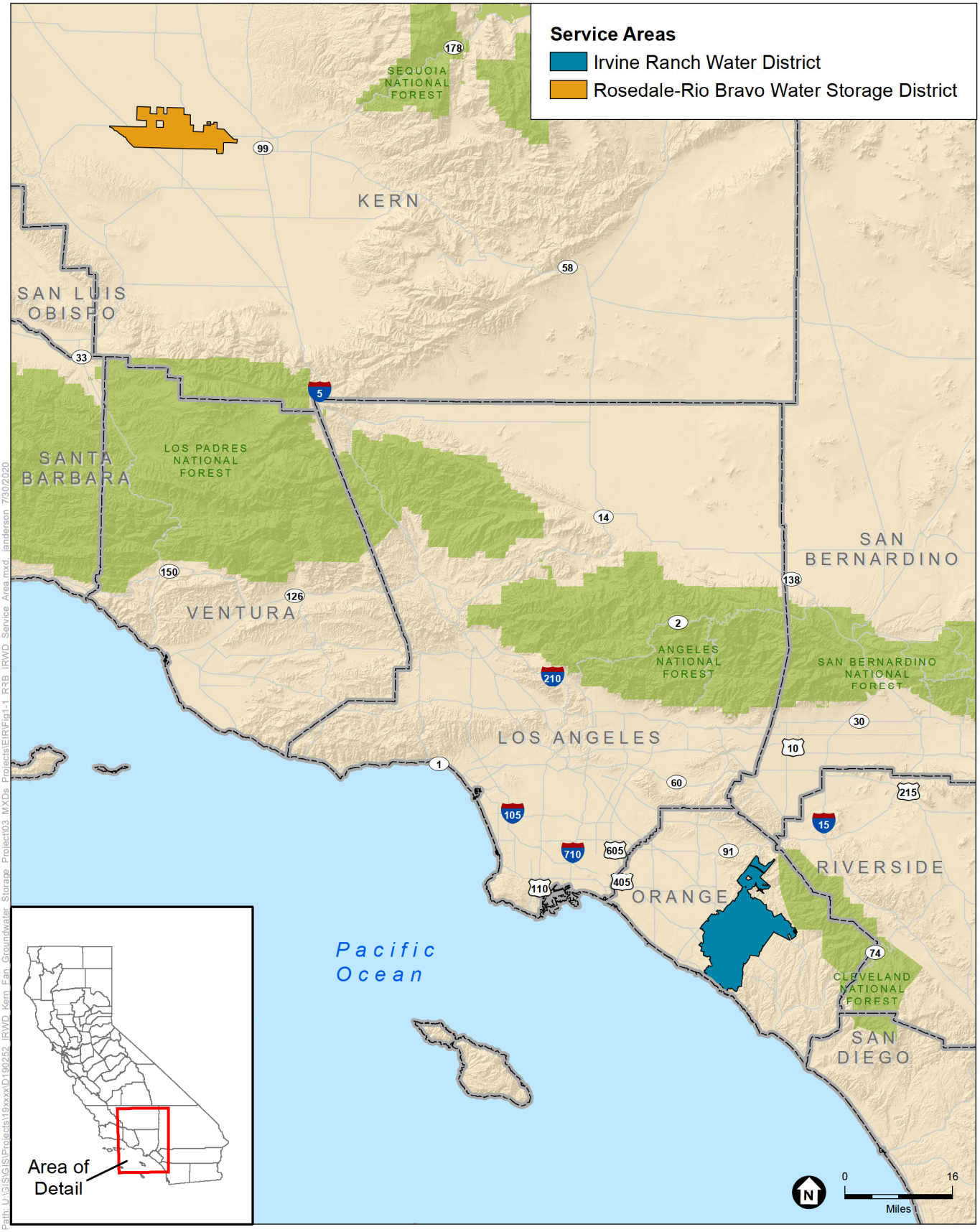
ES.2.2 Irvine Ranch Water District

IRWD was established in 1961 as a California Water District pursuant to the California Water District Law (*California Water Code*, Division 13). IRWD provides drinking water, sewage collection and treatment, recycled water and urban runoff treatment to approximately 422,000 residents encompassing 181 square miles in central Orange County (refer to Figure ES-2). IRWD has a diverse water supply that includes local groundwater, recycled water, imported water, local surface water, and water banking facilities. Approximately 54 percent of the IRWD water supply comes from 26 local groundwater wells; 18 percent is imported from the Metropolitan Water District of Southern California; and 26 percent comes from recycled water.

IRWD currently participates in Rosedale's Conjunctive Use Program through IRWD's Strand Ranch Integrated Banking Project and the Stockdale Integrated Banking Project (Stockdale Project).

ES.2.3 Groundwater Banking Joint Powers Authority

Through the Joint Powers Agreement, Rosedale and IRWD created the Authority, a Joint Powers Authority organized and operating pursuant to Chapter 5 of Division 7 of Title 1 of the Government Code of the State of California (commencing with Section 6500). Rosedale and IRWD are the sole members of the Authority. The purpose of the Authority is to develop, implement and operate the proposed project.



SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure ES-2
Service Area Locations

ESA

ES.3 Project Objectives

The objectives of the proposed project are as follows:

- Capture, recharge and store water from the SWP and CVP and other available water supplies for later use.
- Provide ecosystem public benefits, emergency water supply public benefits during extended droughts or a Delta levee failure, and water supply benefits for agricultural, M&I and federal wildlife refuge uses.
- Provide operating flexibility for Rosedale's existing and future conjunctive use programs.
- Assist in achieving groundwater sustainability within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin through implementation of projects consistent with California Executive Order N-10-19 directing state agencies to develop a "water resilience portfolio."
- Provide Rosedale and IRWD customers and existing partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted.

ES.4 Project Description

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and up to 12 recovery wells on the Kern Fan Project Properties. The Kern Fan Conveyance Facilities would consist of canals and/or pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the project facilities and the California Aqueduct. Subject to agreements between Rosedale and IRWD, the project facilities may be integrated with the other facilities operated in Rosedale's Conjunctive Use Program. Water stored by the proposed project would be recovered when needed to provide ecosystem and water supply benefits.

The proposed project would be operated such that surplus surface water from the SWP, CVP, Kern River and other available water sources would be recharged and stored for subsequent recovery. It is estimated that the project may be able to recharge and store upwards of 100,000 acre-feet per year (AFY). Project capacities are to be allocated as follows:

Pursuant to the award of funds under the California Water Commission's Water Storage Investment Program, twenty-five percent, up to 25,000 AF, of unallocated Article 21 water would be stored for DWR in an "Ecosystem Account." Through the implementation of 1-for-1 exchanges, the Article 21 water stored in the Ecosystem Account would be used by the State of California to alleviate stress on endangered and threatened species in the Sacramento-San Joaquin River Delta. DWR, in consultation with the California Department of Fish and Wildlife, would determine when water from the Ecosystem Account would be needed for such ecosystem benefits. The 1-for-1 exchanges would result in the reclassification of Table A water being held in Lake Oroville for delivery to Rosedale or IRWD as SWP Project water, while the Article 21 water stored in the proposed project's Ecosystem Account would be reclassified as Table A water for use by Rosedale as a member unit of the Kern County Water Agency and IRWD as a

landowner in Dudley Ridge Water District. After the 1-for-1 exchange is complete, DWR would release the SWP Project water from Lake Oroville at its discretion to provide ecosystem benefits. The Table A water would be recovered from the proposed project facilities in Kern County.

The remaining storage capacity would be shared equally between Rosedale and IRWD. Project storage available to Rosedale and IRWD is estimated to be a minimum of 37,500 AF each. Rosedale and IRWD would use the water recharged in their respective accounts for agriculture and M&I uses, improving water supply reliability during droughts and emergencies. Subject to agreements between Rosedale and IRWD, the operation of this remaining storage would be integrated with storage in Rosedale's Conjunctive Use Program and IRWD's Strand and Stockdale Integrated Banking Projects to store Article 21, Section 215, and other water supplies as well as for implementing exchange programs with SWP and CVP Contractors. Up to 40,000 AF of storage from these other programs could be integrated with the proposed project to store CVP Section 215 water. Portions of the Section 215 water stored in the proposed project could be wheeled or exchanged to meet Reclamation Incremental Level 4 demands at the Kern National Wildlife Refuge or other federal refuges. These supplies would be provided to the refuges consistent with the Central Valley Project Improvements Act (CVPIA) and would provide operational flexibility to the CVP.

The proposed project would be implemented in two phases; each phase would construct recharge and recovery facilities on up to 640 acres of land within the project area. Water would be conveyed to and from the proposed recharge and recovery facilities in and around the Phase 1 and 2 areas through existing facilities and a new turnout and conveyance system (Kern Fan Conveyance Facilities) connecting to the California Aqueduct. Project operations would be coordinated with Rosedale's Conjunctive Use Program.

ES.5 Project Alternatives

According to CEQA, an EIR must describe a reasonable range of alternatives to a proposed project that would feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the proposed project's significant environmental effects. The alternatives analysis must include the "No Project Alternative" as a point of comparison. The No Project Alternative includes existing conditions and reasonably foreseeable future conditions that would exist if the proposed project were not approved (*CEQA Guidelines* Section15126.6).

The analysis of project alternatives is discussed in Chapter 6, *Alternatives Analysis*. Alternatives that were considered but rejected include: recharge basin locations, injection wells, Orange County storage, conservation, and recycled water. The process for evaluating alternative alignments for the Kern Fan Conveyance Facilities as part of the *Kern Fan Groundwater Storage Project Feasibility Report* (IRWD and Rosedale, 2020) is also described. In addition to the No Project Alternative, a Water Bank Alternative is also considered in detail.

No Project Alternative

According to Section 15126.6(e) of the *CEQA Guidelines*, discussion of the No Project Alternative must include a description of existing conditions and reasonably-foreseeable future conditions that would exist if the project were not approved. Under the No Project Alternative, the Authority would not construct or operate any proposed recharge, storage, recovery or conveyance facilities in the project area.

The No Project Alternative would not meet most of the project objectives. Without the proposed project, Rosedale and IRWD would continue to capture, recharge, and store water from the SWP, CVP, and other available water supplies for later use through existing projects and facilities within Rosedale's Conjunctive Use Program. Under the No Project Alternative, greater operating flexibility would not be provided for existing and future conjunctive use programs. In addition, under the No Project Alternative, the benefits of the proposed project, which includes ecosystem public benefits, emergency water supply public benefits during extended droughts or a Delta levee failure, and water supply reliability benefits to agricultural and M&I users would not occur. Additionally, under the No Project Alternative, the benefit of the proposed project to provide operational flexibility to the CVP and Incremental Level 4 supplies to federal wildlife refuges would not occur. Finally, under the No Project Alternative, the benefit to groundwater sustainability in the Kern County Sub-basin would not occur.

Water Bank Alternative

The Water Bank Alternative would involve participation in the Willow Springs Water Bank (WSWB). WSWB is located in the Antelope Valley near the border of Kern County and Los Angeles County in Southern California. Similar to the proposed project, the WSWB Conjunctive Use Project has received a conditional funding award by the CWC through the WSIP. The WSWB Conjunctive Use Project would include a regulating reservoir and additional extraction wells, along with new conveyance facilities to move water to and from the California Aqueduct.

The WSWB is partially constructed; once fully constructed, the WSWB would be capable of recharging 250,000 AFY, storing 1,000,000 AF of water underground, and recovering 225,000 AFY (Rosamond Community Services District 2018). The WSWB would consist of approximately 1,100 acres of recharge basins and 77 recovery wells, as well as a 9-mile pipeline connecting to the California Aqueduct, within an overall area of approximately 8,650 acres. As of 2018, 20,000 AFY of imported water has been recharged in the 320-acre basins that have been constructed; none of the stored water has been recovered yet (Rosamond Community Services District 2018). The rest of the WSWB is expected to be constructed by 2022.

The WSWB is located in the adjudicated Antelope Valley Groundwater Basin, which is south and east of Bakersfield and the Tehachapi Mountains. The WSWB is situated on highly permeable soils near three major water conveyance facilities: East Branch of the California Aqueduct, the Antelope Valley-East Kern (AVEK) West Feeder, and the Los Angeles Aqueduct and offers water storage opportunities to both upstream and downstream water agencies (IRWD and Rosedale 2020).

The Southern California Water Bank Authority is proposing to implement the WSIP ecosystem benefits through water transfers with the SWP, whereby a SWP Contractor would use water from the Project in lieu of SWP water. This would allow water stored in Lake Oroville to be dedicated to providing instream flow benefits. The WSWB Conjunctive Use Project proposes providing up to 40,000 AF of water per year to the Feather River in critically dry and dry years via pulse flow releases that would occur in April and May.

Under the Water Bank Alternative, the Authority would acquire capacity in the WSWB Conjunctive Use Project by initially purchasing shares of capacity where one share is equal to 5 AF of storage, 1/3 AF per year of recharge capacity, and 1 AF per year of recovery capacity. Based on the share structure of WSWB Conjunctive Use Project, recharge and recovery capacity is the limiting constraint for moving water into and out of the project facility. To have similar recharge and recovery capacities as compared with the proposed project, the Authority would need to acquire approximately 227,000 shares from WSWB (IRWD and Rosedale 2020).

The Water Bank Alternative would operate on a concept where the Authority would deliver Article 21 and other SWP water supplies via the California Aqueduct and a 9-mile diversion pipeline to the WSWB Conjunctive Use Project's recharge basins. Water delivered to WSWB would need to be pumped to the turnouts on the East Branch of the California Aqueduct which adds substantial power costs to the delivered water. When the stored water is needed, it would be extracted through the WSWB Conjunctive Use Project wellfield and returned to the California Aqueduct for delivery. The water would be directly delivered to IRWD's service area through MWD. There would need to be an exchange with another SWP Contractor in order for Rosedale and IRWD (through Dudley Ridge Water District (DRWD)) to receive their share of stored water within the respective service areas, which are north of the WSWB on the SWP system (Authority 2020).

Ability to Meet Project Objectives

As part of the Water Bank Alternative, the Authority would pay to buy into the developed capacities of the WSWB to store up to 100,000 AF of water. The water stored by the Authority could consist of a mix of unallocated Article 21 and non-Article 21 SWP water. The storage of CVP Section 215 water would not be possible. Only a portion of the project objectives identified as part of the proposed project would be realized with the Water Bank Alternative. Groundwater recharge and storage would occur in the Antelope Valley, and thus, the project objectives that are local to the Kern Fan area of Kern County would not be met. Participation in the WSWB would not generate ecosystem public benefits such as new intermittent wetland benefits in the Kern Fan area. Agricultural benefits resulting from crop substitution and improved groundwater levels, Incremental Level 4 water to federal wildlife refuges, and groundwater sustainability in the Kern County Sub-basin would not occur. The Water Bank Alternative would only achieve one of the project objectives, which is to provide Rosedale and IRWD customers and existing partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted.

Environmentally Superior Alternative

CEQA requires that a Draft EIR identify the environmentally superior alternative of a project other than the No Project Alternative (*CEQA Guidelines* Section 15126.6(e)(2)). The No Project Alternative would avoid all of the mitigated environmental impacts associated with the proposed project because there would be no construction activities to build the proposed facilities, but the No Project Alternative would not meet all of the project objectives. While the proposed project would result in potentially significant impacts, with the incorporation of mitigation measures there would be no Significant and Unavoidable impacts. Therefore, the No Project Alternative does not avoid or substantially lessen significant environmental effects.

The Water Bank Alternative would result in many similar environmental impacts to the proposed project but would not achieve all the project objectives. This alternative would implement similar storage, recovery, and conveyance facilities as the proposed project, but within a different location, in the Antelope Valley at the border of Kern County with Los Angeles County, and a different groundwater basin. Implementation of this alternative could lessen impacts to land use and mineral resources, as described above. However, the Water Bank Alternative would need to operate longer lengths of conveyance facilities in order to deliver water to/from the East Branch of the California Aqueduct and to/from the WSWB facilities. This would increase the energy demand associated with this alternative to levels above the proposed project. Further, since implementation of the Water Bank Alternative would not occur within the Kern Fan area, the local benefits to groundwater sustainability for the Kern County Sub-basin, benefits to wetland habitat, and Incremental Level 4 water for federal wildlife refuges would not take place, resulting in greater impacts to biological resources and groundwater resources.

Because the proposed project does not result in any Significant and Unavoidable impacts, the Water Bank Alternative does not avoid or substantially lessen significant environmental effects. The Water Bank Alternative would only achieve one of the project objectives, which is to provide Rosedale and IRWD customers and existing partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted. Only the proposed project would fully achieve all of the project objectives.

Implementation of the Water Bank Alternative also would reduce benefits to the Delta ecosystem associated with pulse flows from Lake Oroville into the Feather River. If the Authority participates in the WSWB Conjunctive Use Project instead of constructing and operating the proposed project, DWR would forgo the availability of 18,000 to 25,000 AF of pulse flows associated with the proposed project. If the Authority proceeds with the proposed project, then other entities would participate in the WSWB Conjunctive Use Project, and together both groundwater banking projects would have to potential to provide DWR with up to 65,000 AF of water for pulse flows and benefits to fishery resources.

ES.6 Areas of Controversy

Pursuant to *CEQA Guidelines* Section 15123(b)(2), a lead agency is required to include areas of controversies raised by agencies and the public during the public scoping process for this Draft

EIR. Areas of controversy have been identified for the proposed project, based on comments made during the 30-day public review period in response to information published in the Notice of Preparation (NOP). Eight comment letters were received during the NOP scoping period. Commenting parties have requested the EIR evaluate impacts related to groundwater quality and supply, subsidence, consistency with SGMA, land use impacts, Aqueduct construction, coordinated operations, hazards, biological resources, and agricultural resources. The greatest area of known controversy from an environmental perspective is potential impacts to the San Joaquin Valley Groundwater Basin. These concerns have been addressed in Chapters 3 of this Draft EIR.

ES.7 Summary of Impacts

Table ES-1, at the end of this chapter, presents a summary of the impacts and mitigation measures identified for the proposed project. The complete impact statements and mitigation measures are presented in Chapter 3 of this Draft EIR. The level of significance for each impact was determined using significance criteria (thresholds) developed for each category of impacts; these criteria are presented in the appropriate sections of Chapter 3. Significant impacts are those adverse environmental impacts that meet or exceed the significance thresholds; less than significant impacts would not exceed the thresholds. **Table ES-1** indicates the measures that will be implemented to avoid, minimize, or otherwise reduce significant impacts to a less than significant level.

The *CEQA Guidelines* require that an EIR discuss the significant environmental effects of the proposed project (Section 15126.2(a)), which is summarized in Table ES-1 and provided in Chapters 3 and 4 of this Draft EIR. The *CEQA Guidelines* also require that an EIR discuss the significant environmental effects which cannot be avoided (Section 15126.2(b)), and significant irreversible environmental changes which would be caused by the proposed project should it be implemented (Section 15126.2(c)). These are discussed below.

ES.7.1 Significant Unavoidable Environmental Effects

As required by *CEQA Guidelines* Section 15126.2(b), an EIR must describe any significant impacts that cannot be avoided, including those impacts that can be mitigated but not reduced to a less than significant level. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons the project is being proposed, notwithstanding their effect, should be described. The proposed project would not result in any significant impacts as documented in the analyses provided in Chapters 3, 4, and 5 of this Draft EIR.

ES.7.2 Significant Irreversible Environmental Changes

Section 15126.2(c) of the *CEQA Guidelines* require that an EIR analyze the extent to which a project's primary and secondary effects would affect the environment and commit nonrenewable resources to uses that future generations would not be able to reverse. "Significant irreversible environmental changes" include the use of nonrenewable natural resources during the initial and

continued phases of the project, should this use result in the unavailability of these resources in the future. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of these resources are required to be evaluated in an EIR to ensure that such consumption is justified.

Construction and operation activities for the proposed project would require the commitment of renewable and non-renewable sources. Proposed project implementation would necessitate the consumption of resources including, but not limited to: building materials (such as concrete), fuel and operational materials/resources, energy resources, and transportation of persons and goods to and from the proposed project site. Construction activities would specifically require the use of concrete and asphalt, and would require the consumption of fossil fuels, including gasoline and oil, in order to provide power to construction vehicles and equipment. The use of nonrenewable resources for the implementation of the proposed project is justified and would not result in the unavailability of such resources.

ES.8 Organization of this EIR

The chapters of this Draft EIR are as follows:

- **Executive Summary.** This chapter summarizes the contents of the Draft EIR.
- **Introduction and Project Background.** This chapter discusses the purpose of the EIR, the CEQA process, and pertinent background information about both Rosedale and IRWD, and the proposed project.
- **Project Description.** This chapter provides an overview of the proposed project, describes the need for and objectives of the proposed project, and provides detail on the characteristics of the proposed project.
- **Environmental Setting, Impacts and Mitigation Measures.** This chapter describes the environmental setting and identifies the direct, indirect, and cumulative impacts of the proposed project for each of the following environmental topics: Aesthetics; Agriculture and Forestry Resources; Air Quality; Biological Resources; Cultural Resources; Energy; Geology and Soils; Greenhouse Gas Emissions; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Noise; Transportation; Tribal Cultural Resources; Utilities and Service Systems; and Wildfire. Measures to mitigate the impacts of the proposed project are presented for each resource area where significant potential impacts have been identified.
- **Chapter 4, CEQA-Plus Considerations:** This chapter summarizes the proposed project's compliance with CEQA-Plus requirements of the U.S. Environmental Protection Agency, to fulfill the requirement of potential federal funding partners to comply with NEPA.
- **Chapter 5, Growth Inducement.** This chapter describes the potential for the proposed project to induce growth.
- **Chapter 6, Alternatives Analysis.** According to CEQA, an EIR must describe a reasonable range of alternatives to a proposed project that would feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the proposed project's significant environmental effects. CEQA also requires an EIR to analyze a no-project alternative. This chapter presents an overview of the alternatives development process, describes the

alternatives to the proposed project that were considered, and describes potential impacts of the no-project alternative and of feasible alternatives relative to those of the proposed project.

- **Chapter 7, Report Preparers.** This chapter identifies the parties involved in preparing this Draft EIR, including persons and organizations consulted.
- **Appendices:** The appendices include materials related to the scoping process (Appendix A) as well as Rosedale's Operating Plans (Appendix B), technical studies and worksheets that support the impact analyses, such as Air Quality and Greenhouse Gas Emissions Modeling (Appendix C), Biological Resources Technical Report (Appendix D), Energy Calculations (Appendix E), Noise Emissions Calculations (Appendix F), Tribal Outreach (Appendix G) and Hydrogeological Analysis (Appendix H).

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
Aesthetics		
Impact 3.1-1: The proposed project would not have a substantial adverse effect on a scenic vista.	None required	No Impact
Impact 3.1-2: The proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State Scenic Highway.	None required	No Impact
Impact 3.1-3: The proposed project would not substantially degrade the existing visual character or quality of public views of the project area and its surroundings.	None required	Less than Significant Impact
Impact 3.1-4: The proposed project could create a new source of substantial light or glare which would adversely affect sensitive day or nighttime views in the area.	**Mitigation Measure AES-1:** All nighttime construction lighting and security lighting installed on new facilities shall be shielded and directed downward to avoid light spill onto neighboring properties and visibility from surrounding vantage points.	Less than Significant Impact with Mitigation
Impact 3.1-5: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to aesthetics.	Implement Mitigation Measure AES-1.	Less than Significant Impact with Mitigation
Agriculture and Forestry Resources		
Impact 3.2-1: The proposed project would not 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 a non-agricultural use.	None required	Less than Significant Impact
Impact 3.2-2: The proposed project could conflict with existing zoning for agricultural use, or a Williamson Act contract.	**Mitigation Measure AGR-1:** For all portions of the project area under a Williamson Act contract, the use of the property would be managed as applicable in accordance with Kern County's *Agricultural Preserve Standard Uniform Rules*, which identify land uses that are compatible within agricultural preserves established under the Williamson Act.	Less than Significant Impact with Mitigation

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
Impact 3.2-3: The proposed project would not 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)).	None Required	No Impact
Impact 3.2-4: The proposed project would not result in the loss of forest land or conversion of forest land to non-forest use.	None Required	No Impact
Impact 3.2-5: The proposed project would not 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.	None Required	No Impact
Impact 3.2-6: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to agriculture and forestry resources.	Implement Mitigation Measure AGR-1.	Less than Significant Impact with Mitigation
Air Quality		
Impact 3.3-1: The proposed project would not conflict with or obstruct implementation of the applicable air quality plan.	None Required	Less than Significant Impact
Impact 3.3-2: The proposed project could 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.	**Mitigation Measure AIR-1:** The Authority shall require the construction contractor to implement construction equipment features for equipment operating at the project site. These features shall be included in applicable bid documents and successful contractor(s) must demonstrate the ability to supply such equipment. Construction features will include the following: The proposed project shall utilize off-road diesel-powered construction equipment that meet or exceed CARB and USEPA Tier 4 Interim or better off-road emissions standards for equipment rated at 50 horsepower (hp) or greater during project construction. Such equipment will be outfitted with BACT devices including a CARB certified Level 3 Diesel Particulate Filter or equivalent. Alternatively, instead of utilizing Tier 4 equipment, the construction contractor shall revise the project construction phasing and timing of equipment usage and demonstrate that implementation of the project construction schedule would not exceed the San Joaquin Valley Air Pollution Control District threshold for NOx emissions (currently 10 tons/year).	Less than Significant Impact with Mitigation

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
Impact 3.3-3: The proposed project would not expose sensitive receptors to substantial pollutant concentrations.	None Required	Less than Significant Impact
Impact 3.3-4: The proposed project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	None Required	Less than Significant Impact
Biological Resources		
Impact 3.4-1: The proposed project could 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.	**Mitigation Measure BIO-1:** Prior to commencement of project ground disturbing construction, a qualified biologist shall survey for blunt-nosed leopard lizard, in accordance with the most recent CDFW Approved Survey Methodology for the Blunt-Nosed Leopard Lizard. If it is determined that blunt-nosed leopard lizard is present within the project areas, the Authority shall initiate the appropriate project modifications to protect blunt-nosed leopard lizard, including avoidance, minimization, restoration, preservation, or compensation. **Mitigation Measure BIO-2**: If the nesting bird season cannot be avoided and construction or vegetation removal occurs between March 1 – September 15 (January 1 to July 31 for raptors), the following measures would reduce potential impacts to nesting and migratory birds and raptors to less than significant levels: • Within 15 days of site clearing, a qualified biologist shall conduct a preconstruction, migratory bird and raptor nesting survey. The biologist must be qualified to determine the status and stage of nesting by migratory birds and all locally breeding raptor species without causing intrusive disturbance. This survey shall include species protected under the Migratory Bird Treaty Act including California horned lark, which was detected during the July 2020 reconnaissance and tri-colored blackbird, which has a medium potential to occur on-site. The survey shall cover all reasonably potential nesting locations for the relevant species on or closely adjacent to the proposed project site. • The preconstruction survey shall cover all reasonably potential nesting locations on and within 300 feet of the proposed removal areas, and areas that would be occupied by ground-nesting species such as killdeer. A 500-foot radius shall be surveyed in areas containing suitable habitat for nesting raptors, such as trees, utility poles and buildings. • Nesting habitat should be removed prior to the bird breeding season (March 1 – September 15). • If an active nest is confirmed by the biologist, no construction activities shall occur within 250 feet of the nesting site for migratory birds and within 500 feet of the nesting site for	Less than Significant Impact with Mitigation

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
	raptors. The buffer zones around any nest within which project-related construction activities would be avoided can be reduced as determined acceptable by a qualified biologist. Construction activities may resume once the breeding season ends (March 1 – September 15), or the nest has either failed or the birds have fledged. **Mitigation Measure BIO-3:** If construction activities are scheduled to take place outside of the Swainson's hawk nesting season (which runs from March 1 – September 15), then no preconstruction clearance surveys or subsequent avoidance buffers are required. If construction activities are initiated within the nesting season then preconstruction nesting surveys shall be conducted by a qualified biologist prior to ground disturbance, in accordance with the guidance provided in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee, 2000). The required windshield surveys shall cover a one-half mile radius around the project sites. If a nest site is found, the qualified biologist shall determine the appropriate buffer zone around the nest within which project-related construction activities would be avoided. **Mitigation Measure BIO-4**: A pre-construction survey shall be conducted for burrowing owls 14 to 30 days prior to clearing of the site by a qualified biologist in accordance with the most recent CDFW protocol, currently the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). Surveys shall cover suitable burrowing owl habitat disturbed by construction including a 500-foot buffer. The survey would identify adult and juvenile burrowing owls and signs of burrowing owl occupation. This survey shall include two early morning surveys and two evening surveys to ensure that all owl pairs have been located. If occupied burrowing owl habitat is detected on the proposed project site, measures to avoid, minimize, or mitigate impacts shall be incorporated into the proposed project and shall include, but not be limited to, the following: • If owls are identified on or adjacent to the site, a qualified biologist shall provide a pre-construction Worker's Environmental Awareness Program to contractors and their employees that describes the life history and species protection measures that are in effect to avoid impacts to burrowing owls. Construction monitoring will also occur throughout the duration of ground-disturbing construction activities to ensure no impacts occur to burrowing owl. • Construction exclusion areas shall be established around the occupied burrows in which no disturbance shall be allowed to occur while the burrows are occupied. Buffer areas shall be determined by a qualified biologist based on the recommendations outlined in the most recent *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). • If occupied burrows cannot be avoided, a qualified biologist shall develop and implement a Burrowing Owl Management Plan. **Mitigation Measure BIO-5**: Prior to commencement of project activities, a qualified biologist shall conduct a USFWS-approved "early evaluation" of the project area to determine if the project sites	

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
	represent San Joaquin kit fox habitat. If the evaluation shows that the San Joaquin kit fox does not utilize the project sites, and the project will not result in take, then no further mitigation shall be required for this endangered species. If the "early evaluation" finds the presence of kit fox, a San Joaquin kit fox survey shall be conducted by a qualified biologist, in accordance with the most recent USFWS San Joaquin Kit Fox Survey Protocol. If it is determined that the San Joaquin kit fox utilizes the property, then the following measures are required to avoid potential adverse effects to this species: • The Authority shall determine appropriate project modifications to protect kit fox, including avoidance, minimization, restoration, preservation, or compensation. • If evidence of active or potentially active San Joaquin kit fox dens is found within the area to be impacted by the proposed project, appropriate compensation for the habitat loss shall be determined and provided. **Mitigation Measure BIO-6**: Prior to commencement of project activities, a qualified biologist shall survey for Tipton kangaroo rat, in accordance with the most USFWS Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats. If it is determined that Tipton kangaroo rat utilizes the project areas, then the following measures are required to avoid potential adverse effects to this species: • The Authority shall have a qualified biologist conduct trapping to determine if there is a presence of the Tipton kangaroo rat. • If there is presence, the Authority shall determine appropriate project modifications to protect Tipton kangaroo rat, including avoidance, minimization, restoration, preservation, or compensation. **Mitigation Measure BIO-7:** Prior to commencement of project activities, a qualified biologist shall survey for Nelson's antelope squirrel. If it is determined that Nelson's antelope squirrel is detected on the project areas, then the following measures are required to avoid potential adverse effects to this species: • The Authority shall determine appropriate project modifications to protect Nelson's antelope squirrel, including avoidance, minimization, restoration, preservation, or compensation. **Mitigation Measure BIO-8**: Prior to commencement of project activities, a qualified biologist shall survey for American badger. Though there isn't a specific survey protocol for this species, American badger share similar habitat as burrowing owl and San Joaquin kit fox. Surveys shall be conducted for American badger concurrently with either burrowing owl or San Joaquin kit fox. If it is determined that American badger are detected on the project areas, then the following measures are required to avoid potential adverse effects to this species: • The Authority shall determine appropriate project modifications to protect American badger, including avoidance, minimization, restoration, preservation, or compensation.	

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
	Mitigation Measure BIO-9. Prior to the start of construction activities that could affect special-status plant species, a qualified botanist shall conduct a focused survey within the Conveyance Facilities project area for California jewelflower, Hoover's eriastrum, Kern mallow, recurved larkspur, San Joaquin woollythreads, slough thistle, and subtle orache. Focused rare plant surveys shall occur during the typical blooming periods of special-status plants with the potential to occur. If a special-status plant species is found to be present, and avoidance of the species and/or habitat is not feasible, the Authority shall prepare and implement a Revegetation/Restoration Mitigation Plan. The Revegetation/Restoration Mitigation Plan will guide activities during construction and operations and maintenance to avoid and minimize impacts to special-status plant species. **Mitigation Measure BIO-10**: Prior to commencement of project operations and maintenance activities, the Authority shall develop an Operations and Maintenance Plan that details how special-status plant and wildlife species, nesting birds and sensitive natural communities will not be impacted by operations and maintenance activities. Vehicle collisions with special-status wildlife or vehicle trampling of special-status plant species or sensitive natural communities is one example of how operations and maintenance activities could potentially impact biological resources. Some operations and maintenance activities may include pump and facility maintenance and vehicle operation on access roads. **Mitigation Measure BIO-11**: If pesticides will be applied to any areas within the project areas, the Authority shall develop a Pesticide Use Plan that will detail how pesticides, rodenticides, and/or herbicides will be used and how application will not impact special-status plant and wildlife species, nesting birds, wetlands and jurisdictional features, and sensitive natural communities.	
Impact 3.4-2: The proposed project could have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or USFWS.	**Mitigation Measure BIO-12**: If sensitive natural communities will be impacted from construction activities, a focused survey by a qualified botanist shall be conducted to assess and delineate the potential impacts. If evidence of impacts to these sensitive natural communities are observed or anticipated, compensation for the habitat loss shall be provided. Implement Mitigation Measures BIO-10 and BIO-11 during project operation and maintenance.	Less than Significant Impact with Mitigation
Impact 3.4-3: The proposed project could 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.	**Mitigation Measure BIO-13**: Prior to any disturbance of potential jurisdictional resources within the project areas, a jurisdictional delineation of water courses shall be conducted for the purposes of identifying features or habitats that would be impacted by project activities and subject to the jurisdiction of the USACE, RWQCB, and CDFW. The findings shall be included in a jurisdictional delineation report suitable for submittal to these agencies for obtaining a Section 404 permit and/or CDFW Streambed Alteration Agreement.	Less than Significant Impact with Mitigation

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
	Prior to project activities that would result in the discharge of fill or dredged material within waters of the U.S., a Section 404 CWA permit shall be obtained from the USACE and a Section 401 Water Quality Certification shall be obtained from the RWQCB. Prior to activities within streams, ponds, seeps or riparian habitat, or use of material from a streambed, the project applicant shall obtain Waste Discharge Requirements for impacts to waters not subject to the CWA, provide written notification to CDFW pursuant to Section 1602 of the Fish and Game Code, ensure the notification is complete as provided in Section 1602, and comply with the terms of conditions of any agreement CDFW may issue in response to the notification.	
Impact 3.4-4: The proposed project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	None Required	Less than Significant Impact
Impact 3.4-5: The proposed project could conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	Implement Mitigation Measures BIO-1 through BIO-09, BIO-12, and BIO-13 during project construction. Implement Mitigation Measures BIO-10 and BIO-11 during project operation and maintenance.	Less than Significant Impact with Mitigation
Impact 3.4-6: The proposed project could conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan.	**Mitigation Measure BIO-14:** Should facilities be located on the Kern Water Bank, the Authority shall initiate discussions with the Kern Water Bank Authority to ensure Conveyance Facilities located in the Kern Water Bank HCP/NCCP avoid impacts to covered species within the HCP/NCCP area during construction, operations, and maintenance. Implement Mitigation Measures BIO-10 and BIO-11 during project operation and maintenance.	Less than Significant Impact with Mitigation
Impact 3.4-7: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to biological resources	Implement of Mitigation Measures BIO-1 through BIO-14.	Less than Significant Impact with Mitigation
Cultural Resources		
Impact 3.5-1: The project could cause a substantial adverse change in the significance of a historical resource, as defined in *CEQA Guidelines* Section 15064.5.	**Mitigation Measure CUL-1**: The Authority shall retain a Qualified Architectural Historian (defined as an architectural historian, historic architect, or historic preservation professional who meets the Secretary of the Interior's Professional Qualification Standards for History, Architectural History, or Architecture, pursuant to 36 CFR 61) to carry out all mitigation related to historic built environment resources.	Less than Significant Impact with Mitigation

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
	Mitigation Measure CUL-2: Historic Resources Assessment. Once project elements have been sited, the Qualified Architectural Historian shall conduct a historic resources assessment including: a review of pertinent archives and sources to identify historic built environment resources within or adjacent to project components; a pedestrian field survey; recordation of all identified historic built environment resources on California Department of Parks and Recreation 523 forms; evaluation of historic built environment resources that may be affected by the project for listing in the National Register and California Register under Criteria A/1-D/4; impacts analysis; development of appropriate treatment; and preparation of a technical report documenting the methods and results of the assessment. The Historic Resources Assessment Report with recommendations and shall be submitted to the Authority for review and approval prior to the its approval of project plans. **Mitigation Measure CUL-3: Retention of a Qualified Archaeologist.** The Authority shall retain a Qualified Archaeologist (defined as an archaeologist who meets the Secretary of the Interior's Professional Qualification Standards for Archaeology, pursuant to 36 CFR 61) to carry out all mitigation related to archaeological resources. **Mitigation Measure CUL-4**: **Archaeological Resources Assessment**. Once project elements have been sited, the Qualified Archaeologist shall conduct an archaeological resources assessment of the project area(s). This shall include an archaeological resources survey, and Extended Phase I and/or Phase II testing as determined necessary by the Qualified Archaeologist to determine if any archaeological resources qualify as historical resources or unique archaeological under CEQA. The Qualified Archaeologist shall document the results of the assessment in a technical report that follows *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* (OHP 1990). If more than 2 years have passed since the previous records searches, then the Qualified Archaeologist shall conduct searches of the Southern San Joaquin Valley Information Center and Native American Heritage Commission Sacred Lands File prior to conducting the survey. The assessment report shall be completed and approved by the Authority prior to its approval of project plans. **Mitigation Measure CUL-5: Avoidance and Preservation in Place of Archaeological Resources.** The Authority shall make every effort to avoid and preserve in place potentially significant or significant archaeological resources. Avoidance and preservation in place is the preferred manner of mitigating impacts to archaeological resources. Preservation in place may be accomplished by, but is not limited to, avoidance, incorporating the resource into open space, capping, or deeding the site into a permanent conservation easement. In the event that avoidance and preservation in place of a resource is determined by the Authority, in consultation with the Qualified Archaeologist, to be infeasible in light of factors such as project design, costs, and other considerations, then Mitigation Measures CUL-6 shall be implemented for that resource. If avoidance and preservation in place of a resource is determined by the Authority to be feasible, then Mitigation Measures CUL-7 and CUL-8 shall be implemented for that resource.	

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SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
	Mitigation Measure CUL-6: Phase III Archaeological Resources Data Recovery and Treatment. The Qualified Archaeologist shall prepare a Phase III Archaeological Resources Data Recovery and Treatment Plan for all significant resources that will be impacted by the proposed project, including those that qualify as historical resources or unique archaeological resources. When determining if data recovery is necessary, the Qualified Archaeologist shall first consider if the data potential of the impacted portion of the resource has been exhausted through previous testing. The Phase III Archaeological Resources Data Recovery and Treatment Plan shall include: research design; field and laboratory methods; other applicable treatment measures; field security measures; reporting requirements and schedule; procedures for human remains discoveries; curation requirements; and protocols for Native American input, review of documents, and monitoring. For resources that are Native American in origin, treatment shall be developed by the Qualified Archaeologist in consultation with the Authority and one or more Native American representatives listed on the California Native American Heritage Commission's contact list for the project. The Qualified Archaeologist shall submit the final Phase III Archaeological Resources Data Recovery Report to the Southern San Joaquin Valley Information Center within 30 days of its acceptance by the Authority. **Mitigation Measure CUL-7: Cultural Resources Mitigation and Monitoring Program.** The Qualified Archaeologist shall prepare a Cultural Resources Mitigation and Monitoring Program (CRMMP) based on the final approved project design plans. The CRMMP shall be submitted to the Authority at least 60 days prior to the start of any ground-disturbing activities. The CRMMP shall include: an outline of areas and maps where archaeological and Native American monitoring is required; roles and responsibilities of the monitors; procedures to follow in the event of the archaeological resources and human remains discoveries; notification and communication protocols; reporting requirements (e.g., weekly, monthly, final); curation requirements; and protocols for Native American input and review of documents. Upon completion, the Qualified Archaeologist shall submit a final Archaeological Resources Monitoring Report to the Southern San Joaquin Valley Information Center within 30 days of its acceptance by the Authority. **Mitigation Measure CUL-8: Designation of Environmentally Sensitive Areas.** Prior to the start of ground disturbance, any avoided archaeological resources on the project site and within 100 feet of project-related activities shall be marked as Environmentally Sensitive Areas (this includes archaeological resources that qualify as historical resources or unique archaeological resources, or those that have not been evaluated). These areas shall not be marked as archaeological resources, but shall be designated as "exclusion zones" on project plans. The Qualified Archaeologist, or their designee, shall periodically inspect these areas for the duration of project activities in the vicinity to ensure that the area remains intact and no incursions into the exclusion zones have occurred. Upon completion of all project-related activities in the vicinity, all protective signage shall be removed. **Mitigation Measure CUL-9: Construction Worker Cultural Resources Sensitivity Training.** Prior to start of any ground-disturbing activities, the Qualified Archaeologist, or his/her designee, shall conduct cultural resources sensitivity training for all construction personnel. In the event construction crews are phased, additional trainings shall be conducted for new construction personnel.	

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
	Construction personnel shall be informed of the types of archaeological resources that may be encountered, the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains, confidentiality of discoveries, and safety precautions to be taken when working with archaeological and Native American monitors. The Authority shall ensure construction personnel are made available for and attend the training and retain documentation demonstrating attendance. **Mitigation Measure CUL-10: Inadvertent Discovery of Archaeological Resources.** In the event that archaeological resources are encountered during ground disturbance, all activity in the vicinity of the find shall cease (within 100 feet), and the protocols and procedures for discoveries outlined in the CRMMP shall be implemented. The discovery shall be evaluated for potential significance by the Qualified Archaeologist. If the Qualified Archaeologist determines that the resource may be significant, the Qualified Archaeologist shall develop an appropriate treatment plan for the resource. When assessing significance and developing treatment for resources that are Native American in origin, the Qualified Archaeologist and the Authority shall consult with one or more Native American representatives listed on the California Native American Heritage Commission's contact list for the project. The Qualified Archaeologist shall also determine if work may proceed in other parts of the project area(s) while treatment (e.g., data recovery) for cultural resources is being carried out. **Mitigation Measure CUL-11: Curation.** Disposition of Native American archaeological materials shall be determined through consultation between one or more Native American representatives listed on the California Native American Heritage Commission's contact list for the project, the Qualified Archaeologist, and the Authority. Disposition of artifacts associated with Native American human remains shall be determined through consultation between the Most Likely Descendant, landowner, and the Authority. Any significant historic-period archaeological materials that are not Native American in origin shall be curated at a repository accredited by the American Association of Museums that meets the standards outlined in 36 CFR 79.9. If no accredited repository accepts the collection, then it may be curated at a non-accredited repository as long as it meets the minimum standards set forth by 36 CFR 79.9. If neither an accredited nor a non-accredited repository accepts the collection, then it may be offered to a public, non-profit institution with a research interest in the materials, or donated to a local school or historical society in the area for educational purposes, to be determined by the Qualified Archaeologist in consultation with the Authority.	
Impact 3.5-2: The proposed project could cause a substantial adverse change in the significance of an archaeological resource pursuant to *CEQA Guidelines* Section 15064.5.	Implement Mitigation Measures CUL-4 through CUL-11.	Less than Significant Impact with Mitigation

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SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
Impact 3.5-3: The proposed project could disturb human remains, including those interred outside of formal cemeteries.	**Mitigation Measure CUL-12: Inadvertent Discovery of Human Remains.** If human remains are encountered, then the Authority shall halt work in the vicinity (within 100 feet) of the discovery and contact the County Coroner in accordance with *Public Resources Code* Section 5097.98 and *Health and Safety Code* Section 7050.5. If the County Coroner determines the remains are Native American, then the Coroner shall notify the California Native American Heritage Commission in accordance with Health and Safety Code subdivision 7050.5(c), and *Public Resources Code* Section 5097.98. The California Native American Heritage Commission shall designate a Most Likely Descendant for the remains pursuant to *Public Resources Code* Section 5097.98. Until the landowner has conferred with the Most Likely Descendant, the contractor shall ensure the immediate vicinity where the discovery occurred is not disturbed by further activity, is adequately protected according to generally accepted cultural or archaeological standards or practices, and that further activities take into account the possibility of multiple burials. If human remains are encountered, the Qualified Archaeologist, in consultation with the Most Likely Descendant shall prepare a confidential report documenting all activities and it shall be submitted to the California Native American Heritage Commission within 90 days after completion of any treatment.	Less than Significant Impact with Mitigation
Impact 3.5-4: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to cultural resources.	Implement Mitigation Measures CUL-1 through CUL-12.	Less than Significant Impact with Mitigation
Energy		
Impact 3.6-1: The proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	None Required	Less than Significant Impact
Impact 3.6-2: The proposed project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency.	None Required	Less than Significant Impact
Impact 3.6-3: Concurrent construction and operation of the proposed project and related projects in the geographic scope would not result in cumulative short-term and long-term impacts to aesthetics.	None Required	Less than Significant Impact
Geology and Soils		
Impact 3.7-1: The proposed project would not directly or indirectly cause potential substantial	None Required	Less than Significant Impact

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
adverse effects, including the risk of loss, injury, or death involving rupture of known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, and landslides.		
Impact 3.7-2: The proposed project would not result in soil erosion or the loss of topsoil.	None Required	Less than Significant Impact
Impact 3.7-3: The proposed project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and would not result in on- or off-site subsidence or collapse.	None Required	Less than Significant Impact
Impact 3.7-4: The proposed project could be located on expansive soils but would not create direct or indirect substantial risks to life or property.	None Required	Less than Significant Impact
Impact 3.7-5: The proposed project would not have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.	None Required	No Impact
Impact 3.7-6: The proposed project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	**Mitigation Measure PALEO-1: Paleontological Assessment and Mitigation Plan.** Prior to the start of any ground-disturbing activities (e.g., demolition, pot-holing or auguring, boring, drilling, grubbing, construction-related vegetation removal, excavation, trenching, or any other activity that has potential to disturb soil), the Authority shall retain a Qualified Paleontologist who meets the professional criteria established by the Society of Vertebrate Paleontology (SVP) to implement the paleontological resources mitigation measures for the proposed project. Once the locations of the project components have been determined and prior to the initiation of ground disturbance, a paleontological literature, map, and museum locality review shall be conducted in order to assess the paleontological sensitivity of the project component. If the literature, map, and museum locality review identifies potentially sensitive paleontological resources, then the Qualified Paleontologist shall conduct a pedestrian survey and assessment of the project component. A report shall be prepared which summarizes the results of the survey and assessment and provides recommendations regarding implementation of mitigation, as needed. Mitigation may include preparation of a Paleontological Resources Mitigation Monitoring Plan (PRMMP), implementation of the PRMMP including construction monitoring if required, paleontological resources awareness training for construction personnel, and preparation of	Less than Significant Impact with Mitigation

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
	a paleontological monitoring report when construction is complete demonstrating compliance with the PRMMP. **Mitigation Measure PALEO-2: Inadvertent Discoveries of Paleontological Resources**. In the event that paleontological resources are discovered, the Authority will notify the Qualified Paleontologist. The paleontologist will document the discovery as needed, evaluate the potential resource, and assess the significance of the find under the criteria set forth in CEQA Guidelines Section 15064.5. If fossil or fossil bearing deposits are discovered during construction, excavations within 50 feet of the find will be temporarily halted or diverted until the discovery is examined by the Qualified Paleontologist. The paleontologist will notify the appropriate agencies to determine procedures that shall be followed before construction is allowed to resume at the location of the find. If the Authority determines that avoidance is not feasible, the paleontologist will prepare an excavation plan for mitigating the effect of the project on the qualities that make the resource important. The plan will be submitted to the Authority for review and approval prior to implementation.	
Impact 3.7-1: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to geology and paleontological resources.	Implement Mitigation Measures PALEO-1 through PALEO-2**.**	Less than Significant Impact with Mitigation
Greenhouse Gas Emissions		
Impact 3.8-1: The proposed project could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	None Required	Less than Significant Impact
Impact 3.8-2: The proposed project could conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	None Required	Less than Significant Impact
Hazards and Hazardous Materials		
Impact 3.9-1: The proposed project could create a significant hazard to the public or the environment through the routine transport, use, disposal, or the accidental release of hazardous materials.	**Mitigation Measure HAZ-1**: Prior to initiating ground disturbance and construction activities, for project facilities located on lands previously used for active agriculture production, the Authority shall collect representative samples of soils to be analyzed for total petroleum hydrocarbons and pesticides. Rosedale shall avoid if feasible or otherwise remove from the site soils identified as containing hazardous quantities of contaminants and dispose of such soils in accordance with applicable hazardous waste regulations.	Less than Significant Impact with Mitigation

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SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
	Mitigation Measure HAZ-2: In the event that asbestos-containing materials are uncovered during project construction, work at the project sites shall immediately halt and a qualified hazardous materials professional shall be contacted and brought to the project sites to make a proper assessment of the suspect materials. All potentially friable asbestos-containing materials shall be removed in accordance with federal, State, and local laws and the National Emissions Standards for Hazardous Air Pollutants guidelines prior to ground disturbance that may disturb such materials. All demolition activities shall be undertaken in accordance with California Occupational Safety and Health Administration standards, as contained in Title 8 of the CCR, Section 1529, to protect workers from exposure to asbestos. Materials containing more than one percent asbestos shall also be subject to San Joaquin Valley Air Pollution Control District regulations. Demolition shall be performed in conformance with federal, State, and local laws and regulations so that construction workers and/or the public avoid significant exposure to asbestos-containing materials. **Mitigation Measure HAZ-3**: A Phase I Environmental Site Assessment shall be prepared for the project sites to identify potential hazards and hazardous materials located within a one-mile radius. The construction contractor shall be informed of potential hazards and shall develop appropriate plans to avoid or remediate hazards.	
Impact 3.9-2: The proposed project could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	**Mitigation Measure HAZ-4:** Prior to construction of project facilities located within one-quarter mile of a school, the contractors shall coordinate the proposed construction haul route with the impacted school district and school facility to avoid school safety routes	Less than Significant Impact with Mitigation
Impact 3.9-3: The proposed project could 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, could create a significant hazard to the public or the environment.	Implement Mitigation Measures HAZ-1 and HAZ-3.	Less than Significant Impact with Mitigation
Impact 3.9-4: The proposed project is not 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; the proposed project would not result in a safety hazard or excessive noise for people residing or working in the project area.	None Required	No Impact
Impact 3.9-5: The proposed project could impair implementation of or physically interfere with an	Implement Mitigation Measure TRA-1 during project construction.	Less than Significant Impact with Mitigation

TABLE ES-1
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Potential Impact	Mitigation Measure	Significance Determination
adopted emergency response plan or emergency evacuation plan.		
Impact 3.9-6: The proposed project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires.	None Required	Less than Significant Impact
Impact 3.9-7: The proposed project operation could cause an increase in airborne insect populations	**Mitigation Measure HAZ-5**: The Authority shall coordinate with the Kern County Department of Public Health Services and the Kern Mosquito and Vector Control District prior to project operations to develop and implement, if necessary, appropriate insect abatement methods. Such methods shall not utilize any substances that may contaminate groundwater or be harmful to wildlife.	Less than Significant Impact with Mitigation
Impact 3.9-8: The proposed project could result in cumulatively considerable impacts to hazards and hazardous materials.	Implement Mitigation Measures HAZ-1 through HAZ-5. Implement Mitigation Measure TRA-1.	Less than Significant Impact with Mitigation
Hydrology and Water Quality		
Impact 3.10-1: The proposed project could violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.	Implement Mitigation Measure HAZ-1.	Less than Significant Impact with Mitigation
Impact 3.10-2: 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.	None Required	Less than Significant Impact
Impact 3.10-3: The proposed project would substantially alter the existing drainage pattern of the project area but would not result in: substantial erosion, siltation, or flooding on-or offsite; create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage; or impede or redirect flood flows.	None Required	Less than Significant Impact
Impact 3.10-4: The proposed project would not risk the release of pollutants due to project	None Required	Less than Significant Impact

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Potential Impact	Mitigation Measure	Significance Determination
inundation in a flood hazard, tsunami, seiche or dam failure flood zone.		
Impact 3.10-5: The proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	None Required	Beneficial Impact
Impact 3.10-6: Concurrent construction and operation of the proposed project and related projects in the geographic scope would not result in cumulative short-term and long-term impacts to hydrology and water quality**.**	None Required	Less than Significant Impact
Lane Use and Planning		
Impact 3.11-1: The proposed project would not divide an established community.	None Required	No Impact
Impact 3.11-2: The proposed project could cause a significant environmental impact due to a conflict with a County land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect.	Implement Mitigation Measures AGR-1, BIO-10, BIO-11 and BIO-14.	Less than Significant Impact with Mitigation
Impact 3.11-3: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to land use and planning.	Implement Mitigation Measures AGR-1, BIO-10, BIO-11 and BIO-14.	Less than Significant Impact with Mitigation
Mineral Resources		
Impact 3.12-1: The proposed project would not 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.	None Required	Less than Significant Impact
Impact 3.12-2: The proposed project would not result in the loss of availability of a locally-important mineral resource recovery site	None Required	No Impact

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
delineated on a local general plan, specific plan or other land use plan.		
Impact 3.12-3: Concurrent construction and operation of the proposed project and related projects in the geographic scope would not result in cumulative short-term and long-term impacts to mineral resources.	None Required	No Impact
Noise		
Impact 3.13-1: The proposed project could generate 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.	**Mitigation Measure NOI-1:** The construction contractors shall consider recovery well locations prior to 24-hour drilling to ensure that no occupied residential dwelling is within 1,000 feet of any well location. In the event that recovery well drilling cannot be sited greater than 1,000 feet from any occupied residential dwelling, a Noise Control Plan shall be developed and implemented prior to construction that includes best management practices to minimize exposure to high levels of noise and ensure compliance with the Kern County Noise Ordinance. Best management practices may include, but not be limited to the following: • Place all stationary construction equipment so that emitted noise is directed away from occupied residential dwellings. • Locate equipment staging in areas that will create the greatest possible distance between construction-related noise sources and noise-sensitive residential dwellings. • Ensure proper maintenance and working order of equipment and vehicles, and that all construction equipment is equipped with manufacturers approved mufflers and baffles. • Install sound-control devices in all construction and impact equipment. Additional equipment muffling beyond standard mufflers may be implemented. • Install portable acoustic panels between the construction zone and sensitive land uses.	Less than Significant Impact with Mitigation
Impact 3.13-2: The proposed project would not generate or result in excessive groundborne vibration or groundborne noise levels.	None Required	Less than Significant Impact
Impact 3.13-3: The proposed project would not expose people residing or working in the project area to excessive noise levels 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.	None Required	No Impact

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Potential Impact	Mitigation Measure	Significance Determination
Impact 3.13-4: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to noise.	Implement Mitigation Measure NOI-1	Less than Significant Impact with Mitigation
Transportation		
Impact 3.14-1: The proposed project could conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	**Mitigation Measure TRA-1: Traffic Control Plan.** The construction contractor, in coordination with the Authority, shall prepare a Construction Traffic Control Plan that conforms to requirements of the Kern County Public Works Department and California Department of Transportation District 6, as applicable prior to the start of construction. The Construction Traffic Control Plan shall be prepared in accordance with both the California Department of Transportation Manual on Uniform Traffic Control Devices and Work Area Traffic Control Handbook and may include, but not be limited to, the following issues: • Haul routes and timing of deliveries of heavy equipment, building materials and oversize loads; • Directing construction traffic with a flag person; • Placement of temporary signage, lighting, and traffic control devices if required; • Access for emergency vehicles to the project sites; • Temporarily closing travel lanes or delaying traffic during materials delivery; • Detours or alternative routes for bicyclists using on-street bicycle lanes as well as for pedestrians using adjacent sidewalks The Authority shall also notify local emergency responders of any planned partial or full lane closures required for project construction. Emergency responders include fire departments, police departments, and ambulances that have jurisdiction within the project area. Written notification and disclosure of lane closure location must be provided at least 30 days prior to the planned closure to allow emergency response providers adequate time to prepare for lane closures.	Less than Significant Impact with Mitigation
Impact 3.14-2: The proposed project would not conflict or be inconsistent with *CEQA Guidelines* section 15064.3, subdivision (b).	None Required	Less than Significant Impact
Impact 3.14-3: The proposed project could substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	Implement Mitigation Measure TRA-1 and Mitigation Measure HAZ-4.	Less than Significant Impact with Mitigation
Impact 3.14 4: The proposed project could result in inadequate emergency access.	Implement Mitigation Measure TRA-1.	Less than Significant Impact with Mitigation

TABLE ES-1
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Potential Impact	Mitigation Measure	Significance Determination
Impact 3.14-5: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to transportation.	Implement Mitigation Measure TRA-1.	Less than Significant Impact with Mitigation
Tribal Cultural Resources		
Impact 3.15-1a: The proposed project would not 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 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).	None Required	No Impact
Impact 3.15-1b: The proposed project would not cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources 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 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 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.	None Required	No Impact
Impact 3.15-2: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative impacts to tribal cultural resources.	None Required	No Impact

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Potential Impact	Mitigation Measure	Significance Determination
Utilities and Service Systems		
Impact 3.16-1: The proposed project would not 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.	None Required	Less than Significant Impact
Impact 3.16-2: The proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.	None Required	Less than Significant Impact
Impact 3.16-3: The proposed project would not result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	None Required	No Impact
Impact 3.16-4: The proposed project would not 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.	None Required	Less than Significant Impact
Impact 3.16-5: The proposed project would comply with federal, State, and local management and reduction statutes and regulations related to solid waste.	None Required	No Impact
Impact 3.16-6: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to utilities and service systems.	None Required	Less than Significant Impact
Wildfire		

TABLE ES-1
SUMMARY OF PROJECT IMPACTS AND MITIGATION MEASURES

Potential Impact	Mitigation Measure	Significance Determination
Impact 3.17-1: The proposed project could substantially impair an adopted emergency response plan or emergency evacuation plan.	Implement Mitigation Measure TRA-1.	Less than Significant Impact with Mitigation
Impact 3.17-2: The proposed project would not, 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.	None Required	Less than Significant Impact
Impact 3.17-3: The proposed project would not 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.	None Required	Less than Significant Impact
Impact 3.17-4: The proposed project would not expose people or structures to significant risks, including downslope or downstream flooding or landslide, as a result of runoff, post fire slope instability, or drainage changes.	None Required	Less than Significant Impact
Impact 3.17-5: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to wildfire.	Implement Mitigation Measure TRA-1.	Less than Significant Impact with Mitigation

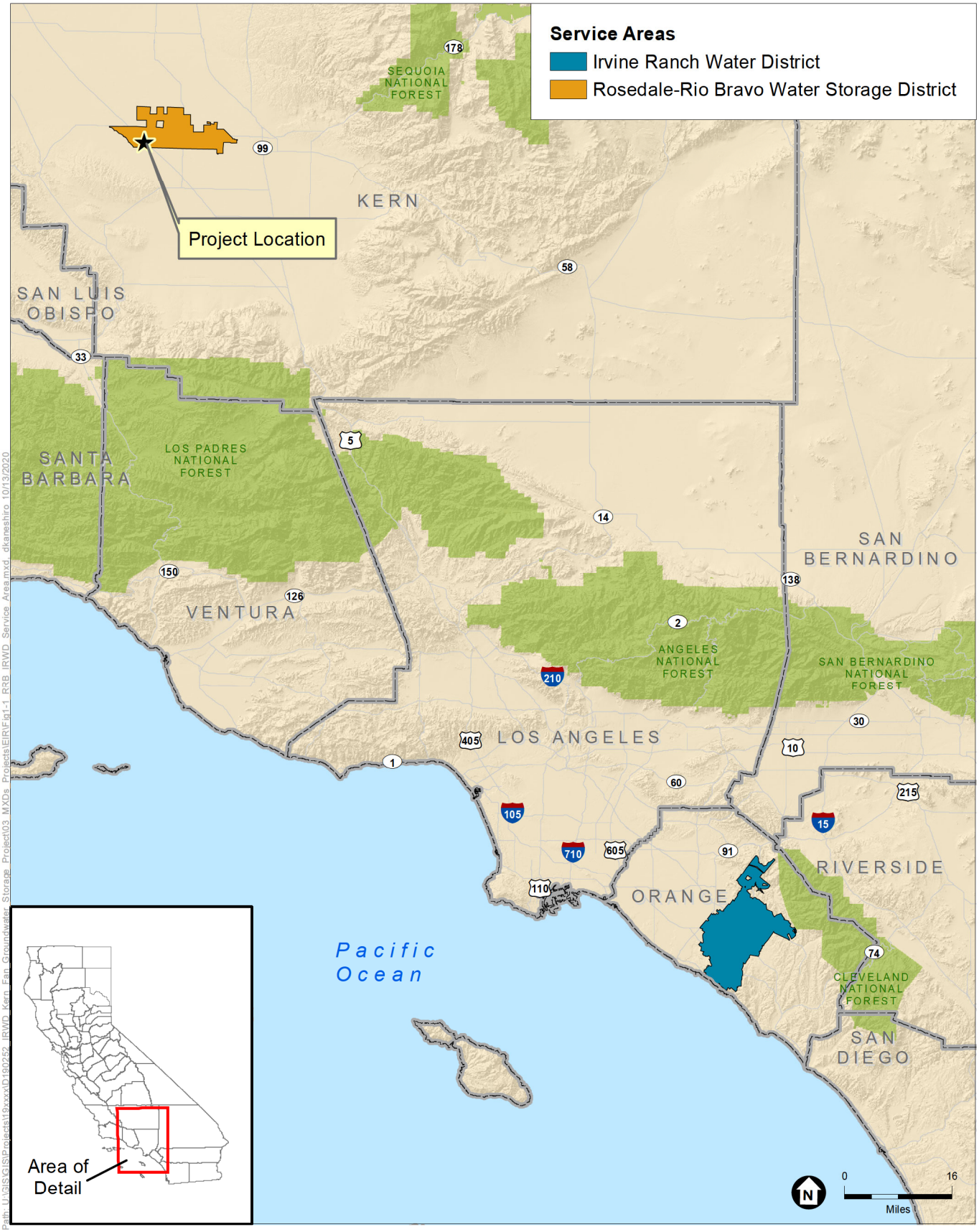
CHAPTER 1
Introduction and Project Background

Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) have formed the Groundwater Banking Joint Powers Authority (Authority) for the purpose of developing, constructing and operating the Kern Fan Groundwater Storage Project (proposed project) in western Kern County (see **Figure 1-1**). The proposed project would involve the construction and operation of water conveyance, recharge and recovery facilities. The proposed recharge and recovery facilities would be constructed in two phases on approximately 1,300 acres of agricultural or vacant land within or near the Rosedale service area. The proposed project would also involve the acquisition of easements for construction, operation and maintenance of proposed Kern Fan Conveyance Facilities that would deliver water to and from the California Aqueduct and other facilities operated in Rosedale's Conjunctive Use Program. Implementation of the proposed facilities would allow Rosedale and IRWD to more effectively manage sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin.

The Notice of Preparation for the proposed project's Environmental Impact Report explained that Rosedale would conduct California Environmental Quality Act (CEQA) review as the Lead Agency until Rosedale and IRWD formed a joint powers authority to complete CEQA review. The *Joint Powers Agreement Between Rosedale-Rio Bravo Water Storage District and Irvine Ranch Water District Creating the Groundwater Banking Joint Powers Authority to Develop and Administer a Kern Fan Groundwater Storage Project* (Joint Powers Agreement) became effective July 1, 2020. Pursuant to *CEQA Guidelines* Section 15051(d), the Authority has assumed the role of Lead Agency to complete CEQA review for the proposed project. Rosedale and IRWD are considered Responsible Agencies.

1.1 Purpose of the EIR

The Authority, as the Lead Agency, has prepared this Draft Environmental Impact Report (EIR) in compliance with CEQA of 1970 (as amended), codified at *California Public Resources Code* Sections 21000 et. seq., and the State *CEQA Guidelines* codified at Title 14, Division 6, Chapter 3 of the *California Code of Regulations*. The purpose of the Draft EIR is to provide the public and pertinent agencies with information about the potential effects on the local and regional environment associated with construction and operation of the proposed project. This Draft EIR describes the environmental impacts of the proposed project and suggests mitigation measures where necessary to avoid or reduce any significant impacts. The impact analyses are based on a variety of sources, including publicly available documents, agency consultation, technical studies and field surveys.



SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1-1
Service Area Locations

ESA

In addition, this Draft EIR has been prepared in accordance with the CEQA-Plus requirements of the U.S. Environmental Protection Agency, to fulfill the requirement of potential federal funding partners to comply with the National Environmental Policy Act (NEPA).

The Authority's Board of Directors, as the decision-making body for the Lead Agency, independently shall consider and certify this EIR prior to approving the proposed project. The Lead Agency shall certify that this EIR has been completed in compliance with CEQA and that the EIR reflects its independent judgment and analysis (*CEQA Guidelines* Section15090(a)). The IRWD and Rosedale Boards of Directors, as the decision-making bodies for Responsible Agencies, shall separately consider the Lead Agency's EIR prior to approving the project, and shall certify that it reviewed and considered the information contained in this EIR (*CEQA Guidelines* §15050(b)).

1.2 Organization of this EIR

The chapters of this Draft EIR are as follows:

- **Executive Summary.** This chapter summarizes the contents of the Draft EIR.
- **Introduction and Project Background.** This chapter discusses the purpose of the EIR, the CEQA process, and pertinent background information about both Rosedale and IRWD, and the proposed project.
- **Project Description.** This chapter provides an overview of the proposed project, describes the need for and objectives of the proposed project, and provides detail on the characteristics of the proposed project.
- **Environmental Setting, Impacts and Mitigation Measures.** This chapter describes the environmental setting and identifies the direct, indirect, and cumulative impacts of the proposed project for each of the following environmental topics: Aesthetics; Agriculture and Forestry Resources; Air Quality; Biological Resources; Cultural Resources; Energy; Geology and Soils; Greenhouse Gas Emissions; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Noise; Transportation; Tribal Cultural Resources; Utilities and Service Systems; and Wildfire. Measures to mitigate the impacts of the proposed project are presented for each resource area where significant potential impacts have been identified.
- **Chapter 4, CEQA-Plus Considerations:** This chapter summarizes the proposed project's compliance with CEQA-Plus requirements of the U.S. Environmental Protection Agency, to fulfill the requirement of potential federal funding partners to comply with NEPA.
- **Chapter 5, Growth Inducement.** This chapter describes the potential for the proposed project to induce growth.
- **Chapter 6, Alternatives Analysis.** According to CEQA, an EIR must describe a reasonable range of alternatives to a proposed project that would feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the proposed project's significant environmental effects. CEQA also requires an EIR to analyze a no-project alternative. This chapter presents an overview of the alternatives development process, describes the alternatives to the proposed project that were considered, and describes potential impacts of the no-project alternative and of feasible alternatives relative to those of the proposed project.

- **Chapter 7, Report Preparers.** This chapter identifies the parties involved in preparing this Draft EIR, including persons and organizations consulted.
- **Appendices:** The appendices include materials related to the scoping process (**Appendix A**) as well as Rosedale's Operating Plans (**Appendix B**), technical studies and worksheets that support the impact analyses, such as Air Quality and Greenhouse Gas Emissions Modeling (**Appendix C**), Biological Resources Technical Report (**Appendix D**), Energy Calculations (**Appendix E**), Noise Emissions Calculations (**Appendix F**), Tribal Outreach (**Appendix G**), and Hydrogeological Analysis (**Appendix H**).

1.3 CEQA Environmental Review Process

1.3.1 CEQA Process Overview

The basic purposes of CEQA are to (1) inform decision makers and the public about the potential, significant adverse environmental effects of proposed governmental decisions and activities, (2) identify the ways those environmental effects can be avoided or significantly reduced, (3) prevent significant, avoidable and adverse environmental effects by requiring changes in projects through the use of alternatives or mitigation measures when feasible, and (4) disclose to the public the reasons why an implementing agency may approve a project even if significant unavoidable environmental effects are involved.

An EIR uses a multidisciplinary approach, applying social and natural sciences to make a qualitative and quantitative analysis of all the foreseeable environmental impacts that a proposed project would exert on the surrounding area. As stated in *CEQA Guidelines* Section 15151:

> *An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible.*

This Draft EIR has been prepared to comply with CEQA and the *CEQA Guidelines* and is to be used by local regulators and the public in their review of the potential significant adverse environmental impacts of the proposed project and alternatives, and mitigation measures that would minimize or avoid those potential environmental effects. The Authority, will consider the information presented in this Draft EIR, along with other factors, prior to considering and making any final decisions regarding the proposed project.

CEQA-Plus Requirements

As noted above, this Draft EIR has been prepared in accordance with the CEQA-Plus requirements of the U.S. Environmental Protection Agency (USEPA) to fulfill the requirement of potential federal funding partners to comply with NEPA. The CEQA-Plus requirements are intended to supplement CEQA and the *CEQA Guidelines* with specific requirements for environmental documents. They are not intended to supersede or replace *CEQA Guidelines*.

Prior to the approval of a federal funding agreement, federal consultation with agencies such as the U.S. Fish and Wildlife Service and the State Historic Preservation Office must be completed.

As such, this Draft EIR has been prepared to support federal consultations pursuant to Section 7 of the federal Endangered Species Act (FESA) and Section 106 of the National Historic Preservation Act, and includes a Clean Air Act conformity analysis (if in a nonattainment area or an attainment area subject to a maintenance plan). In addition, this Draft EIR also demonstrates compliance with federal laws and cross-cutter regulations, including the Clean Water Act, Farmland Protection Policy Act, Migratory Bird Treaty Act, Flood Plain Management Act, Wild and Scenic Rivers Act, and Coastal Zone Management Act. Chapter 4 of this Draft EIR addresses all federal laws and regulations in fulfillment of CEQA-Plus requirements, including an analysis of Environmental Justice.

1.3.2 Notice of Preparation and Public Scoping

Pursuant to *CEQA Guidelines* Section 15082, the lead agency is required to send a Notice of Preparation (NOP) stating that an EIR will be prepared to the State Office of Planning and Research (OPR), Responsible and Trustee agencies, and federal agencies involved in funding or approving the project. The NOP must provide sufficient information in order for responsible agencies to make a meaningful response. At a minimum, the NOP must include a description of the project, location of the project, and probable environmental effects of the project (*CEQA Guidelines* Section 15082(a)(1)). Within 30 days after receiving the NOP, Responsible and Trustee agencies and OPR shall provide the lead agency with specific detail about the scope and content of the environmental information related to that agency's area of statutory responsibility that should be included in this Draft EIR (*CEQA Guidelines* Section 15082(b)).

On April 8, 2020, a Notice of Preparation (NOP) of an EIR was published for a 30-day review period and circulated to OPR and local, State, and federal agencies, including Responsible and Trustee agencies, as well as organizations and persons who expressed interest in the proposed project. The NOP comment period extended through May 8, 2020. The NOP provided a general description of the proposed project, a description of the proposed project area, and an overview of environmental topics that will be evaluated within the EIR. The NOP was made available on the Rosedale and IRWD websites. A copy of the NOP and comment letters are included in this Draft EIR in **Appendix A**. Eight comment letters were received in response to the NOP.

On April 29, 2020, in accordance with *CEQA Guidelines* Section 15082, Rosedale and IRWD virtually held a public scoping meeting to describe the proposed project, to identify the environmental topics that would be addressed, and to describe the CEQA process for the EIR. To notify the public of the Scoping Meeting, Rosedale and IRWD published the legal notification in the *Bakersfield Californian* and the *Orange County Register*, and posted information about the meeting on Rosedale's and IRWD's websites. Rosedale and IRWD provided an opportunity for attendees to submit written or verbal comments on the scope of the environmental analysis to be included in this Draft EIR. The meeting was facilitated using Zoom, a virtual communication program, in compliance with pandemic related orders of the State of California. No written comments were submitted at the scoping meeting. Verbal comments raised during the scoping meeting included inquiries on specific locations for proposed facilities including recharge and recovery facilities, and the proposed turnout location from the California Aqueduct (Aqueduct).

Known Areas of Controversy and Issues of Concern

Pursuant to *CEQA Guidelines* Section 15123(b)(2), a lead agency is required to include areas of controversies raised by agencies and the public during the public scoping process for this Draft EIR. Areas of controversy have been identified for the proposed project, based on comments made during the 30-day public review period in response to information published in the NOP. Eight comment letters were received during the NOP scoping period. Those comments are included in Appendix A. Commenting parties have requested the EIR evaluate impacts related to groundwater quality and supply, subsidence, consistency with SGMA, land use impacts, Aqueduct construction, coordinated operations, hazards, biological resources, and agricultural resources. The greatest area of known controversy from an environmental perspective is potential impacts to the San Joaquin Valley Groundwater Basin.

1.3.3 Draft EIR

This Draft EIR has been prepared pursuant to the requirements of *CEQA Guidelines* Section 15126. This Draft EIR provides an analysis of reasonably foreseeable impacts associated with the construction, operation, and maintenance of the proposed project. The environmental baseline for determining potential impacts is the date of publication of the NOP for the proposed project unless otherwise indicated (*CEQA Guidelines* Section 15125(a)). The baseline setting for each environmental topic assessed in this Draft EIR describes the existing conditions as of the publication of the NOP. The impact analysis is based on changes to existing conditions that would result due to implementation of the proposed project.

In accordance with the *CEQA Guidelines* Section 15126, Chapter 3 of this Draft EIR describes the proposed project area and the existing baseline environmental setting, identifies potential short-term, long-term, and cumulative adverse environmental impacts associated with project implementation, and identifies mitigation measures for potentially significant adverse impacts. Significance criteria are defined at the beginning of each impact analysis section for each environmental topic analyzed in this Draft EIR. In addition, Chapter 5 of this Draft EIR analyzes potential growth-inducing impacts, and Chapter 6 of this Draft EIR provides an analysis of alternatives to the project.

1.3.4 Draft EIR Public Review

In accordance with Section 15105 of the *CEQA Guidelines*, this Draft EIR has been submitted to the OPR State Clearinghouse for review by State agencies. In addition, this Draft EIR has been circulated to federal, State, and local agencies and interested parties who may wish to review and provide comments on its contents. A minimum 45-day public review period is required for a Draft EIR submitted to the OPR State Clearinghouse. The Draft EIR is available for public review from **October 16, 2020 to November 30, 2020**. Please submit all comments to:

Groundwater Banking Joint Powers Authority
P.O. Box 20820
Bakersfield, CA 93390-0820
Attn: Eric Averett, General Manager
eaverett@rrbwsd.com

During the 45-day public review period, the Authority will hold one public meeting (virtual) to receive public comments on the environmental analysis in the Draft EIR. The meeting will include a brief presentation providing an overview of the proposed project and findings of the Draft EIR. After the presentation, oral comments will be accepted. Written comments also may be submitted anytime during the 45-day review period. The public meeting will be held as follows:

Virtual Public Meeting Details

Date:	November 4, 2020
Time:	2:00 PM
Zoom:	http://bit.ly/kernfanmeeting
Telephone Dial-in:	(213) 338-8477 or (877) 853-5247
Meeting ID:	891 5693 0018

1.3.5 Final EIR Publication and Certification

Once this Draft EIR public review period has ended, the Authority will prepare written responses to all comments. The Final EIR will be comprised of this Draft EIR, responses to comments received on this Draft EIR, and any changes or corrections to this Draft EIR that are made as part of the responses to comments. The Authority will make the Final EIR available for public review prior to considering any final decision regarding approval of the proposed project (*CEQA Guidelines* Section 15089(b)). The Final EIR must be available to commenting agencies at least 10 days prior to certification (*CEQA Guidelines* Section 15088(b)).

Prior to considering the proposed project for approval, the Authority will review and consider the information presented in the Final EIR and will certify that the Final EIR has been adequately prepared in accordance with CEQA. Once the Final EIR is certified, the Authority's Board of Directors may proceed to consider any final decisions regarding the proposed project (*CEQA Guidelines* Sections 15090, 15096(f)). Prior to approving the proposed project, the Authority must make written Findings in accordance with Section 15091 of the *CEQA Guidelines*. In addition, the Authority must adopt a Statement of Overriding Considerations (SOC) concerning each significant environmental effect identified in the Final EIR (if any) that cannot be fully mitigated to a less than significant level. If one is needed, then the SOC will be included in the record of the proposed project's approval and mentioned in the Notice of Determination (NOD) following *CEQA Guidelines* Section 15093(c). Pursuant to *CEQA Guidelines* Section 15094, the Authority will file an NOD with the State Clearinghouse and County Clerk within five working days, if the proposed project is approved.

1.3.6 Mitigation Monitoring and Reporting Program

CEQA Guidelines Section 15097 requires lead agencies to "adopt a program for monitoring or reporting on the revisions which it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects" (*CEQA Guidelines* Section 15097(a)). The

mitigation measures, if any, adopted as part of the Final EIR will be included in a Mitigation Monitoring and Reporting Program (MMRP) and implemented by the Authority.

1.4 Project Background

Through the Joint Powers Agreement, Rosedale and IRWD created the Authority, a Joint Powers Authority organized and operating pursuant to Chapter 5 of Division 7 of Title 1 of the Government Code of the State of California (commencing with Section 6500). Rosedale and IRWD are the sole members of the Authority. The purpose of the Authority is to develop, implement and operate the proposed project.

1.4.1 Rosedale-Rio Bravo Water Storage District

The water districts of Kern County are leaders in the development of groundwater banking programs in California. Portions of Kern County are characterized by hydrogeologic conditions that are particularly suitable for groundwater recharge operations. Kern County is also strategically located in central California near federal, State, and local water supply conveyance facilities. The groundwater banking programs of Kern County benefit local customers and water districts and also provide groundwater storage for districts in northern and southern California.

Rosedale is located west of Bakersfield and encompasses approximately 44,150 acres in Kern County, with 27,500 acres developed as irrigated agriculture and approximately 7,500 acres developed for urban uses (refer to Figure 1-1). Rosedale's service area overlies the Kern County Sub-basin ("sub-basin") of the larger San Joaquin Valley Groundwater Basin, and was established in 1959 to develop a groundwater recharge program to offset overdraft conditions in the underlying sub-basin. Prior to the groundwater recharge efforts initiated by Rosedale, groundwater levels in the District were declining at a rate of eight to ten feet per year. Through implementation of groundwater recharge programs and participation in the State Water Project (SWP), Rosedale slowed the decline in groundwater levels dramatically. In the mid-1990s, groundwater levels again were declining, and Rosedale initiated the Conjunctive Use Program.

Defining Conjunctive Use

"Conjunctive use" refers to coordinating the management of surface water and groundwater to improve the overall reliability of water supply (Pacific Institute 2011). "Groundwater banking" is the practice of recharging specific amounts of water in a groundwater basin that can later be withdrawn and used by the entity that deposited the water (Pacific Institute 2011). Groundwater banking uses underground aquifers for percolation and storage purposes, as an alternative to building aboveground storage, and offers water users both within and outside of the groundwater basin the opportunity to store water there. It allows flexibility to respond to seasonal and inter-annual variability, as water can be stored in wet periods, when water is abundant, for use in dry periods, when water may be in short supply. Groundwater banking programs may benefit water levels in the local aquifer because the amount of water available for recovery is less than the amount recharged; this difference can help to mitigate existing overdraft conditions and raise groundwater levels.

Rosedale's Conjunctive Use Program

Rosedale's Conjunctive Use Program currently manages more than 500,000 acre-feet (AF) of stored water in the underlying sub-basin, which has an estimated total storage capacity in excess of 1.7 million AF. The Conjunctive Use Program encompasses a broad range of activities intended to benefit Rosedale and its landowners through better management of the groundwater resource, integrating and incorporating all of Rosedale's available facilities to this end.

Rosedale has groundwater banking agreements with several participants as part of the Conjunctive Use Program, under which all recharge must occur in advance of extraction. Water supplies for Rosedale's programs, including its Conjunctive Use Program, are provided by participating water agencies and include high-flow Kern River water and supplies from the Central Valley Project (CVP) and SWP. Currently, the infrastructure for Rosedale's programs includes over 2,000 acres of recharge basins and numerous recovery wells (**Figure 1-2**). The Conjunctive Use Program and other Rosedale programs provide a maximum annual recharge of more than 228,600 acre-feet per year (AFY), maximum annual recovery of more than 89,500 AFY, and underground storage of more than 1,700,000 AF.

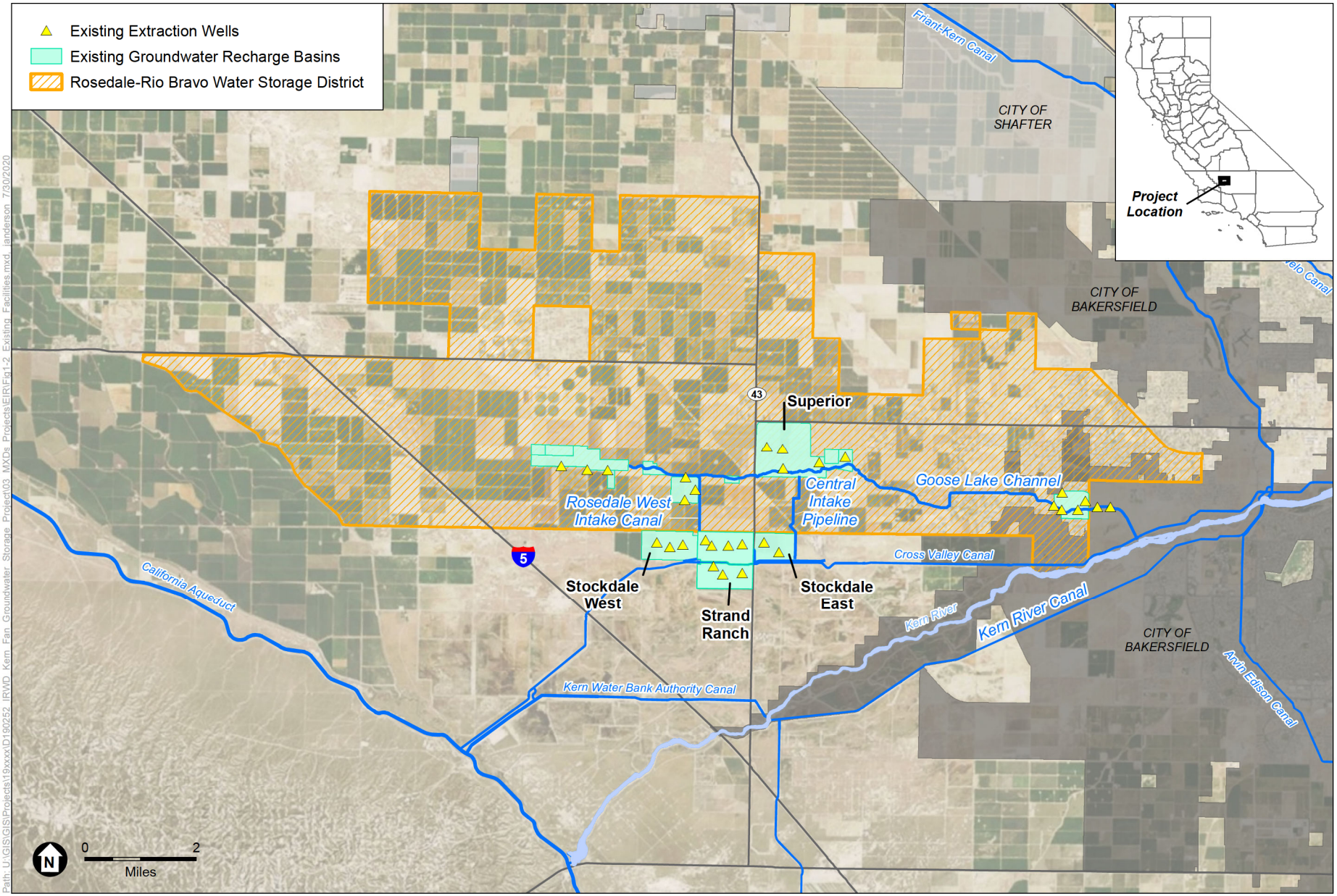
1.4.2 Rosedale Operating Plans

Memoranda of Understanding

Effective January 1, 2003, Rosedale entered into two (2) Memoranda of Understanding (MOUs) with adjoining entities in the Kern Fan area, which include Semitropic Water Storage District, Buena Vista Water Storage District, Henry Miller Water Storage District, Berrenda Mesa Water Storage District, Kern Water Bank Authority (KWBA), Improvement District No. 4, and West Kern Water District. The MOUs provide guidelines for operation and monitoring of Rosedale's groundwater banking programs. The proposed project would be subject to and consistent with the conditions of these MOUs, which are provided in **Appendix B**.

The MOUs allow for Rosedale to operate its Conjunctive Use Program to achieve maximum water storage and withdrawal benefits, while also avoiding, eliminating, or mitigating adverse impacts to the groundwater basin and to the operation of other groundwater banking programs in the Kern Fan area. As part of the operating objectives defined in the MOUs, Rosedale's Conjunctive Use Program includes the following:

- Maintain, or if possible enhance, the quality of the groundwater in its district. For example, Rosedale will attempt to implement recovery operations in such a manner that TDS in recovery waters exceed TDS of recharge waters.
- Control the migration of poor quality water. For example, Rosedale could increase water recharge in areas with favorable groundwater gradients.
- Operate recharge and recovery facilities in such a manner to "prevent, eliminate, or mitigate significant adverse impacts." Mitigation measures to avoid adverse impacts could include but not be limited to the following:
  - if necessary provide buffer areas between recovery wells and neighboring districts;
  - limit monthly or annual recovery rates;



SOURCE: Mapbox; Kern County

Kern Fan Groundwater Storage Project

Figure 1-2

Existing Facilities within the Project Area

ESA

- provide redundancy in recovery wells and rotate pumping from recovery wells;
- provide adequate well spacing;
- adjust or stop pumping if necessary to reduce impacts; and
- use recharge water that otherwise is not recharging the Kern Fan area.

The MOUs also establish a Monitoring Committee, which includes Rosedale and all Adjoining Entities. The Monitoring Committee is collectively responsible for monitoring groundwater levels and water quality in the Kern Fan area. The MOUs stipulate that modifications to Rosedale's Conjunctive Use Program would be subject to environmental review pursuant to CEQA and would require review by the Monitoring Committee. Operation of the proposed project would be coordinated with Rosedale's Conjunctive Use Program, and this EIR will satisfy the CEQA requirements as indicated in the MOUs.

Long Term Operations Plan

Rosedale has also developed the *Long Term Project Recovery Operations Plan Regarding Rosedale-Rio Bravo Water Storage District Projects* (Long Term Operations Plan), which implements the provisions of the MOU and is provided in Appendix B. This Long Term Operations Plan is based on the *Project Recovery Operations Plan Regarding Pioneer Project, Rosedale-Rio Bravo Water Storage District, And Kern Water Bank Authority Projects* (Project Recovery Operations Plan), under which both Rosedale and adjoining banking projects are currently required to operate.[1] The proposed project will be operated in accordance with the Long Term Operations Plan, the purpose of which is to designate specific measures to be employed to "prevent, eliminate or mitigate significant adverse impacts" resulting from project operations. A general description of the primary components of the Long Term Operations Plan is as follows:

A. Establish a Protocol for Monitoring and Reporting Groundwater Conditions:

- Conduct monitoring of groundwater conditions during years that recovery is expected from a Rosedale project, in addition to the monitoring conducted by the Kern Fan Monitoring Committee; report current groundwater levels monthly to the Rosedale Board of Directors; and make reports available to the public on Rosedale's website.
- Regularly update Rosedale's Groundwater Model to actual conditions; use the Model to predict future groundwater conditions; report modeling results to the Rosedale Board of Directors; and make modeling results available to the public on Rosedale's web site.

[1] The Project Recovery Operations Plan is a voluntary agreement entered into by Rosedale, the Kern Water Bank and the Kern County Water Agency. It governs the operations of various banking projects, including Rosedale's projects that are subject to an MOU, the Kern Water Bank Project, and the Pioneer Project (which is operated by the Kern County Water Agency). The purpose of the Project Recovery Operations Plan is to designate specific measures to be employed to "prevent, eliminate or mitigate significant adverse impacts" resulting from project operations. The intent of the parties to the Project Recovery Operations Plan is to mitigate and/or compensate for legitimate project impacts. The initial term of the Project Recovery Operations Plan term expired on January 31, 2019. The parties agreed to extend the term for an additional two years to January 31, 2021. The parties have initiated discussions regarding a further extension of the term. The proposed project will be subject to and consistent with the conditions of the Project Recovery Operations Plan during its effective term.

- Recovery in any calendar year shall not commence until the Model has been run for projected operations.

B. Implement Proactive Measures

- Rosedale's Groundwater Model will be used to predict the contribution of Rosedale's projects to groundwater level declines in the area. The Model will be used to simulate and compare the No-Project Condition to the Project Condition. The No-Project Condition is the water level that would have been at any particular well location absent the Rosedale project.
- The Model will be periodically run and updated as recovery plans become known or change in any given year.
- The Model will be used to identify a negative project impact (NPI) based on the comparison of No-Project Conditions and Project Conditions, and to identify the wells at risk of impact during recovery operations.

C. Establish Triggers and Mitigation Actions

- Mitigation measures will be implemented when a NPI is triggered in years when average water levels at specified wells[2] are more than 140 feet from the surface as measured on March 31 each year. It is expected that water levels will not decline to an extent resulting in a NPI when water levels are less than 140 feet from the surface.
- A NPI is triggered when the Model results predict that groundwater levels under Project Conditions are 30 feet deeper than No-Project Conditions at a nearby existing and operative well, and the well has (or is expected to) experience mechanical failure or other operational problems due to declining water levels. Given historical fluctuations in groundwater levels in the area when other nearby groundwater banking projects are recovering, it is expected that additional declines attributable to the proposed project beyond historic low groundwater levels could result in operational problems at some existing wells.
- Agricultural Wells. The following measures would be implemented when a NPI is triggered for an operational agricultural well:
  - When the Model predicts a NPI outside the current operating range of the pump but within the potential operating range of the well, then Rosedale will provide compensation to lower the well pump to meet the landowner's needs.
  - When the Model predicts a NPI outside the current and potential operating range of the well, then Rosedale will supply an equivalent water supply to the affected landowner from an alternate source at no greater cost; provide other acceptable mitigation to the landowner; or reduce or adjust pumping as necessary to prevent, avoid, or eliminate the NPI.
- Domestic Wells. The following measures would be implemented when a NPI is triggered for a domestic well:
  - When the Model predicts a NPI such that production ceases or is likely to cease, then Rosedale will provide compensation to implement one of the following: lower the domestic submersible pump bowl setting sufficient to restore and maintain service; provide a one-time permanent connection to the nearest water service provider; or drill

[2] Wells 29S/25E-27N1&2, 29S/25E-25M1&2, 29S/26E-31H1&2, and 29S/25E-35G01 are the wells used to monitor groundwater levels. These wells have been determined to be best suited for detecting fluctuations in groundwater levels due to project operations.

and equip a new domestic well. If necessary, Rosedale will provide interim in-home water supplies until one of these actions is completed.

1.4.3 Irvine Ranch Water District

IRWD was established in 1961 as a California Water District pursuant to the California Water District Law (*California Water Code*, Division 13). IRWD provides drinking water, sewage collection and treatment, recycled water and urban runoff treatment to approximately 422,000 residents encompassing 181 square miles in central Orange County (refer to Figure 1-1). IRWD has a diverse water supply that includes local groundwater, recycled water, imported water, local surface water, and water banking facilities. Approximately 54 percent of the IRWD water supply comes from 26 local groundwater wells; 18 percent is imported from the Metropolitan Water District of Southern California; and 26 percent comes from recycled water.

IRWD currently participates in Rosedale's Conjunctive Use Program through IRWD's Strand Ranch Integrated Banking Project and the Stockdale Integrated Banking Project (Stockdale Project) (see project information below and Figure 1-2).

Strand Ranch Integrated Banking Project

IRWD currently participates in Rosedale's Conjunctive Use Program through IRWD's Strand Ranch Project. Strand Ranch is located in western Kern County and borders Rosedale's service area (see Figure 1-2). The Strand Ranch Project includes approximately 502 acres of groundwater recharge basins; seven production wells that have been completed onsite; and joint-use wells constructed offsite by Rosedale. In the Strand Ranch Project, IRWD has the ability to recharge up to 17,500 AFY, to store up to 50,000 AF, in accordance with its banking project terms with Rosedale. IRWD has priority rights to use the recharge basins when Rosedale is not recharging Kern River floodwaters and has first priority rights to the use of the recovery facilities. Rosedale has second priority use of Strand Ranch facilities. The water that Rosedale stores on its own behalf does not count against the 50,000 AF of storage dedicated to IRWD. Rosedale manages operation of the Strand Ranch Project on behalf of IRWD. An EIR was prepared, certified, and approved for the Strand Ranch Integrated Banking Project in 2007-2008, followed by addenda most recently approved in February 2016 (State Clearinghouse No. 2007041080).

Stockdale Integrated Banking Project

IRWD also participates in Rosedale's Conjunctive Use Program through the Stockdale Integrated Banking Project. An EIR was prepared, certified, and approved by Rosedale and IRWD in December 2015 for the Stockdale Integrated Banking Project (Stockdale Project). The EIR evaluated the Stockdale East and Stockdale West recharge and recovery sites (Figure 1-2), and a potential third project site (collectively Stockdale Properties) that would be located within the vicinity of both east and west properties. Because the location of the third project site had not been identified, a program level analysis of impacts was provided in the EIR.

There is approximately 26,000 AF of available storage under Stockdale West and approximately 18,400 AF of available storage under Stockdale East. This is additive to Rosedale's existing 1.7 million AF of storage that underlies its services area, given that Stockdale East and Stockdale

West are outside of Rosedale's boundary. However, Rosedale manages the Stockdale Properties and their associated storage along with the Conjunctive Use Program.

Recharge capacities for the Stockdale Properties are estimated to be approximately 27,100 AFY for Stockdale West and approximately 19,000 AFY for Stockdale East. Recovery capacity is estimated to be approximately 11,250 AFY at Stockdale West and approximately 7,500 AFY at Stockdale East. All groundwater banking facilities on Stockdale West are owned by IRWD and operated and maintained by Rosedale. All groundwater banking facilities on Stockdale East are owned, operated, and maintained by Rosedale.

Constructed as part of the Stockdale Project, the Central Intake Pipeline connects the Goose Lake Slough to the Cross Valley Canal (CVC) and serves as a conveyance for delivery of recharge water to Stockdale East and the existing Superior Basins, and for delivery of water pumped from Stockdale East wells and other Rosedale wells on the Superior Basins to regional conveyance facilities via the CVC (see Figure 1-2). The Central Intake Pipeline generally runs along and between existing agricultural parcels, along the eastern edge of the Stockdale East property, and up to a new pump station and CVC turnout/turn-in facility. The Central Intake Pipeline is owned and operated by Rosedale.

1.5 References

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CHAPTER 2
Project Description

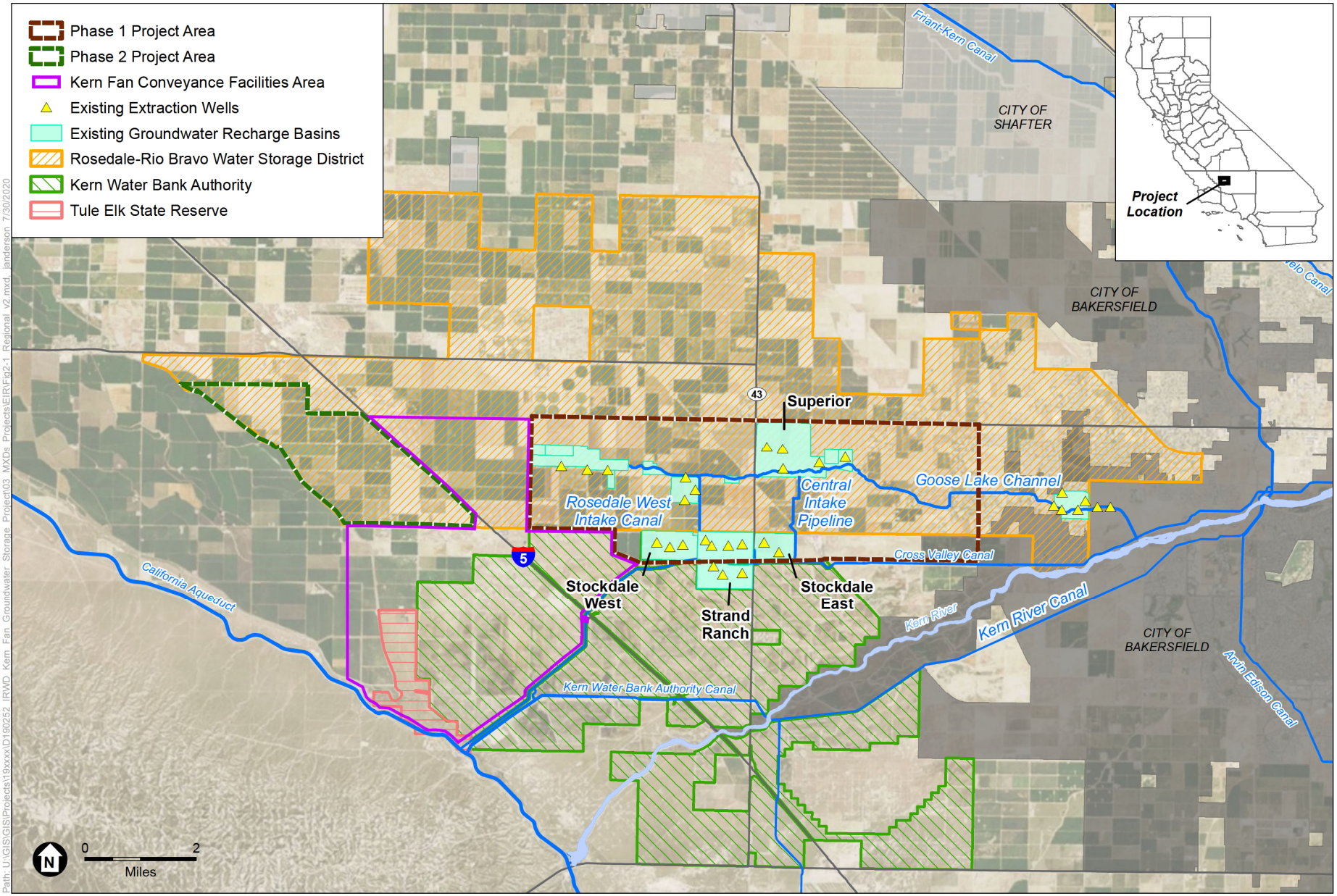
2.1 Overview and Project Location

The proposed project would allow the Authority to more effectively manage sources of water supply available to Rosedale and IRWD by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, the Authority would develop water recharge and recovery facilities in the Kern Fan area of Kern County, California (**Figure 2-1**). The proposed project would recharge, store, recover and deliver:

- State Water Project (SWP) water, including Article 21 water;
- Central Valley Project (CVP) water, including Section 215 water;
- Kern River water available to the Authority through agreement(s) with existing right holders; and
- Water from other sources when available.

The stored SWP water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial (M&I) uses. A portion of the stored CVP water would be used to provide Incremental Level 4 supplies to federal wildlife refuges as well as supply reliability benefits to agricultural, and M&I uses. The proposed project would involve the construction and operation of water conveyance, recharge and recovery facilities. Constructed recharge basins, when inundated, would also provide intermittent wetland habitat to benefit local and migratory birds.

The proposed project would be located in western Kern County, west of the City of Bakersfield. The proposed recharge and recovery facilities would be constructed in two phases on approximately 1,300 acres of agricultural or vacant land (Kern Fan Project Properties) within or near the Rosedale service area. The proposed project would also involve the acquisition of easements for construction, operation and maintenance of proposed Kern Fan Conveyance Facilities that would deliver water to and from the California Aqueduct and other facilities operated in Rosedale's Conjunctive Use Program. The proposed areas for the project facilities are shown in Figure 2-1; based on availability of lands for purchase, the proposed recharge and recovery facilities may be located in the Phase 1 area, Phase 2 area, or anywhere within the project boundary (see Figure 2-1).



SOURCE: Mapbox; Kern County

Kern Fan Groundwater Storage Project

Figure 2-1

Regional Project Location

ESA

2.2 Project Objectives

The objectives of the proposed project are as follows:

- Capture, recharge and store water from the SWP and CVP and other available water supplies for later use.
- Provide ecosystem public benefits, emergency water supply public benefits during extended droughts or a Delta levee failure, and water supply benefits for agricultural, M&I and federal wildlife refuge uses.
- Provide operating flexibility for Rosedale's existing and future conjunctive use programs.
- Assist in achieving groundwater sustainability within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin through implementation of projects consistent with California Executive Order N-10-19 directing State agencies to develop a "water resilience portfolio."
- Provide Rosedale and IRWD customers and existing partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted.

2.3 Purpose and Need for the Project

California has a Mediterranean climate with a highly variable precipitation and hydrology regime; typically, each year includes a winter wet season when water demand is lowest and a summer dry season when water demand is highest. The result of a highly variable hydrologic regime is the periodic availability of surface water supplies that exceed demands but cannot be utilized due to insufficient storage capacity. Additionally, during dry years and extreme drought conditions, there are insufficient water supplies to meet demands. To improve availability and reliability of existing sources of water supply, additional capture and storage is needed for sustainable water supply management in California. The proposed project would increase the reliability of water supplies during dry years by capturing and storing surplus surface water that would otherwise be lost to the ocean.

The proposed project has received a conditional award of funding through the California Water Commission's Water Storage Investment Program (WSIP). The WSIP is funded by the Proposition 1 Water Quality, Supply and Infrastructure Act of 2014. The purpose of the WSIP is to fund water storage projects that provide public benefits, improve operation of the State water system, and provide a net improvement in ecosystem and water quality conditions. The proposed project was analyzed in the Storage Integration Study (2017) prepared by the Association of California Water Agencies. This study defined and quantified the benefits of integrating the operation of new storage projects with existing SWP and Central Valley Project (CVP) operations to help fulfill statewide water supply needs and priorities. Eight projects were described in this study that could provide such benefits, including the proposed project.

Section 4007 of the *Water Infrastructure Improvements for the Nation Act* (WIIN Act; P.L. 114-322), enacted in December 2016, created a new authority for the Bureau of Reclamation (Reclamation) to build water storage projects in the western United States. The proposed project

is expected to be eligible for funding under the WIIN Act as a “State-led” groundwater storage project found to have a federal benefit in accordance with reclamation laws.

There is approximately 1.7 million acre-feet (AF) of storage within the aquifer underlying the Rosedale service area. The purpose of the proposed project is to augment the recharge, storage, and extraction capabilities of existing programs and provide the project participants greater operational flexibility. By storing additional surface water underground in Kern County, the proposed project would benefit groundwater levels in the Kern County Sub-basin and help support groundwater sustainability efforts required by the Sustainable Groundwater Management Act (SGMA). Rosedale is a member agency of the Kern Groundwater Authority, which submitted its Groundwater Sustainability Plan (GSP) to DWR in January 2020 (KGA 2020). The proposed project is included in the Kern Groundwater Authority GSP, within the Rosedale-Rio Bravo Management Area (Rosedale 2019). In addition, the proposed project would enhance water supply reliability by augmenting supplies for periods when other sources may be limited or unavailable.

The proposed project is consistent with the water management goals of California. In its Water Resilience Portfolio (July 2020), the State renewed its commitment to integrated water management as a means to provide reliable, sustainable and secure water resources and management systems, which includes improving water supply reliability, reducing groundwater overdraft and land subsidence, and protecting water quality and environmental conditions. It specifically recognizes the benefits of storing high flows in California’s groundwater aquifers which can provide a crucial buffer against drought and climate change. The proposed project is also consistent with federal goals of increasing storage in California and introducing additional operational flexibility to the CVP.

State Water Project

The California Department of Water Resources (DWR) delivers water to 29 SWP contractors through the California Aqueduct, including 21 contractors located south of the Sacramento-San Joaquin River Delta. The SWP Water Supply Contract for each contractor includes a "Table A” allocation specifying the maximum amount of SWP water that can be requested for delivery each year. DWR's initial Table A water allocation in early winter typically is adjusted through spring to reflect the evolving variable conditions affecting annual water availability. Rosedale currently receives SWP Table A water through a water supply contract with Kern County Water Agency, a SWP contractor. IRWD is a landowner in the Dudley Ridge Water District (DRWD), which is also a SWP contractor. Through IRWD’s land ownership in DRWD, IRWD is entitled to a portion of DRWD’s Table A allocation.

In addition to allocating Table A water, DWR periodically makes water supplies available under Article 21 of the SWP contracts. Article 21 states that DWR may offer to sell and deliver surplus SWP water when its available supplies exceed scheduled Table A delivery requests from the SWP contractors, the Sacramento-San Joaquin Delta is in an excess flow condition under applicable regulatory standards, and SWP facilities have available conveyance capacity. When “Article 21 water” becomes available, SWP contractors submit their delivery requests to DWR; when Article 21 supplies exceed SWP contractor demands, the Article 21 supply becomes

“unallocated.” The proposed project would increase the ability to capture, store and reregulate "unallocated Article 21 water" for beneficial use by Authority members Rosedale and IRWD. The proposed project would increase the overall water within the SWP system, reduce the loss of water to the ocean, and provide ecosystem benefits in accordance with the proposed project’s funding conditions.

Central Valley Project

The CVP is a federal power and water management project in California under the supervision of Reclamation. The CVP was devised in 1933 in order to provide irrigation and municipal water to much of California's Central Valley by regulating and storing water in reservoirs in the northern half of the State, and transporting it to the San Joaquin Valley and its surroundings by means of a series of canals, aqueducts and pump plants, some shared with the SWP. In addition, the CVP provides flood control, hydroelectric power, and recreation.

The CVP consists of an interconnected engineered system of reservoirs, aqueducts, and flood control measures, constructed by Reclamation to manage flooding and provide reliable water supplies year-round with highly managed water storage, release, and conveyance infrastructure. The proposed project is located in the San Joaquin Valley which is part of the Friant Division of the CVP. Most water from the CVP is delivered to the San Joaquin Valley through the Friant-Kern Canal.

The Friant Dam was constructed across the San Joaquin River between 1937 and 1942 as part of a CVP Reclamation water project to provide irrigation water to the southern San Joaquin Valley. The dam impounds Millerton Lake, a 4,900-acre reservoir about 15 miles north of Fresno. Most of the stored water is used by various irrigation districts and other water users that have contracts for the water. Because of its relatively small storage capacity relative to the average annual discharge of the San Joaquin River, Friant Dam often has to release excess water that could be otherwise used for irrigation or power generation. Section 215 of the *Reclamation Reform Act* (Public Law 97-293) authorizes Reclamation to provide temporary water service contracts, referred to as Friant 215 contracts, for un-storable flood flows (Section 215 water) as a result of an unusually large water supply not otherwise storable for Project purposes or infrequent and otherwise unmanaged flood flows of short duration. The availability of Section 215 water is at Reclamation’s discretion and dependent on reservoir capacity and operations, hydrologic conditions, and Friant operating guidelines.

The proposed project is located within the CVP Place of Use. Rosedale has a contract for Section 215 water, as available. In addition, the Authority proposes to secure a contract for Section 215 water and use it in a way that is mutually beneficial to the Authority and Reclamation by making portions of the banked Friant 215 contract supplies available to meet federal wildlife refuge Incremental Level 4 demands through exchanges and that provide operational flexibility to the CVP.

2.4 Description of the Proposed Project

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and up to 12 recovery wells on the Kern Fan Project Properties. The Kern Fan Conveyance Facilities would consist of canals and/or pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the project facilities and the California Aqueduct. Subject to agreements between Rosedale and IRWD, the project facilities may be integrated with the other facilities operated in Rosedale's Conjunctive Use Program. Water stored by the proposed project would be recovered when needed to provide ecosystem and water supply benefits.

The proposed project would be operated such that surplus surface water from the SWP, CVP, Kern River, and other available water sources would be recharged and stored for subsequent recovery. It is estimated that the project may be able to recharge and store upwards of 100,000 acre-feet per year (AFY). Project capacities are to be allocated as follows:

Pursuant to the award of funds under the WSIP, twenty-five percent, up to 25,000 AF, of the unallocated Article 21 water would be stored for DWR in an "Ecosystem Account." Through the implementation of 1-for-1 exchanges, the Article 21 water stored in the Ecosystem Account would be used by the State of California to alleviate stress on endangered and threatened species in the Sacramento-San Joaquin River Delta. DWR, in consultation with the California Department of Fish and Wildlife, would determine when water from the Ecosystem Account would be needed for such ecosystem benefits. The 1-for-1 exchanges would result in the reclassification of Table A water being held in Lake Oroville for delivery to Rosedale or IRWD as SWP Project water, while the Article 21 water stored in the proposed project's Ecosystem Account would be reclassified as Table A water for use by Rosedale as a member unit of the Kern County Water Agency and IRWD as a landowner in Dudley Ridge Water District. After the 1-for-1 exchange is complete, DWR would release the SWP Project water from Lake Oroville at its discretion to provide ecosystem benefits. The Table A water would be recovered from the proposed project facilities in Kern County.

The remaining storage capacity would be shared equally between Rosedale and IRWD. Project storage available to Rosedale and IRWD is estimated to be a minimum of 37,500 AF each. Rosedale and IRWD would use the water recharged in their respective storage accounts for agriculture and M&I uses, improving water supply reliability during droughts and emergencies. Subject to agreements between Rosedale and IRWD, the operation of storage for the Authority members would be integrated with storage in Rosedale's Conjunctive Use Program and IRWD's Strand and Stockdale Integrated Banking Projects to store Article 21, Section 215, and other water supplies as well as for implementing exchange programs with SWP and CVP Contractors. Up to 40,000 AF of storage from these other programs could be integrated with the proposed project to store CVP Section 215 water. Portions of the Section 215 water stored in the proposed project could be wheeled or exchanged to meet Reclamation Incremental Level 4 demands at the Kern National Wildlife Refuge or other federal refuges. These supplies would be provided to the refuges consistent with the Central Valley Project Improvements Act (CVPIA) and would provide operational flexibility to the CVP.

The proposed project would be implemented in two phases; each phase would construct recharge and recovery facilities on approximately 640 acres of land within the project area (Figure 2-1). Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and a new turnout and conveyance system (Kern Fan Conveyance Facilities) connecting to the California Aqueduct. Project operations would be coordinated with Rosedale's Conjunctive Use Program. The following sections describe the proposed facilities.

2.4.1 Recharge Facilities

The proposed project would include the construction of recharge basins of varying shape, size and depth within approximately 1,300 acres. Basins would be formed by excavating and contouring existing soils to form earthen berms. Typical basin berms would be approximately 3 to 6 feet above ground.

Dirt roads approximately 14 to 20 feet wide would run along the perimeter of and in between all basins to provide access to facilities during operation and maintenance activities. Surface water would be delivered to the basins for recharge through the new Kern Fan Conveyance Facilities and other facilities operated in Rosedale's Conjunctive Use Program. The basins would be connected by check structures to allow recharge water to flow by gravity among basins. The basins would be managed to allow agricultural land uses (e.g., annual farming or grazing) to continue when the basins are empty. Typical recharge facilities are shown in **Figure 2-2**.

Intermittent Wetlands

The proposed project would establish intermittent wetland habitat through intermittent recharge events. The primary purpose of the proposed project is to construct and operate recharge basins that allow water to infiltrate and recharge into the underlying aquifer for storage until it is needed. During the years that the proposed project takes and recharges water into storage, the basins would be inundated with water and would provide intermittent wetland habitat to support waterfowl, shorebirds, raptors and other migratory birds along the Pacific Flyway. The wetlands to be established by the proposed project would be considered intermittent because the water supply delivered for recharge may not be available for recharge year-round or during periods of drought (IRWD and Rosedale 2020).

2.4.2 Recharge Water Supplies

The proposed project would receive, recharge and store SWP Article 21 water, which is a surplus supply managed by DWR, as described above. Other water supplies also may be secured and acquired by the Authority, Rosedale or IRWD from various sources that may include federal, State, and local supplies through transfers, balanced and unbalanced water exchange agreements, water purchases or temporary transfers, or other available means. Sources may also include supplies from the Kern River water depending on annual hydrologic availability, water rights and regulatory considerations described below.

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SOURCE: Irvine Ranch Water District, 2020

Kern Fan Groundwater Storage Project

Figure 2-2
Typical Recharge and Conveyance Facilities

ESA

As previously described, the CVP is a network of federally owned reservoirs, power plants, and canals that delivers surface water for agriculture, M&I and other uses in the CVP's Central Valley service area. Reclamation owns and operates the CVP and periodically makes excess non-storable Section 215 flood water available during wet years. This surplus CVP water could be delivered to the proposed project from the CVP's Friant-Kern Canal and through the Cross Valley Canal or other facilities in Rosedale's Conjunctive Use Program. Rosedale has a contract with Reclamation providing fourth-priority rights to acquire Section 215 water from the Friant Division under certain conditions. IRWD does not have contract rights to acquire CVP water, so IRWD would not be able to take Section 215 water for use in serving IRWD's customers in Orange County – absent an exchange for water IRWD can use or the addition of IRWD to the CVP water rights place of use and any necessary agreements. The Authority could also establish its own Friant 215 contract.

Surface water rights, including pre-1914 and post-1914 appropriative water rights, are held by water districts and other parties throughout California. These water rights can be transferred to other parties as long as legal users of water are not injured (per *Water Code* Sections 1706 and 1702). The State Water Resources Control Board (SWRCB) supervises transfers of water under post-1914 appropriative water rights through a change-petition program, but the SWRCB does not directly supervise water transfers under pre-1914 appropriative water rights. Water transfers under post-1914 appropriative water rights are contingent upon the SWRCB finding that the transfer will not injure other legal users of water or cause unreasonable effects on fish or wildlife or other in-stream beneficial uses (SWRCB 1999). Should the use of such appropriative water rights require evaluation of effects to legal users and other environmental considerations, additional analysis may be required.

Rosedale currently receives Kern River surface water through agreements with the City of Bakersfield, Buena Vista Water Storage District, and other Kern River entities through water banking and temporary water service agreements. IRWD's Strand Ranch Project currently receives pre-1914 Kern River surface water from Buena Vista Water Storage District pursuant to an Exchange Program agreement under the Buena Vista Water Storage District Water Management Program.

Kern River water also is available during wet years when the U.S. Army Corps of Engineers (USACE) mandates release of water from Isabella Reservoir for flood control purposes. The Kern River Watermaster records the amount of water released daily from the Isabella Reservoir into the Kern River. During periods of mandatory release, releases from the Isabella Reservoir may be available for recharge and storage in the proposed project.

Kern River surface water that may be available for the proposed project could occur when this water (1) is offered to all takers willing to sign a "Notice/Order"; or (2) is offered to the Kern River/California Aqueduct Intertie for disposal; or (3) is expected to flood farm acreage; or (4) is expected to be delivered into the Kern River Flood Channel for disposal out-of-county. Kern River surface water would be conveyed to the proposed project through the CVC, Pioneer Canal or the Goose Lake Channel, or any other facility available to Rosedale, subject to any necessary approvals or agreements.

In addition to the above water supplies that will be available to the proposed project, it is anticipated that other water supplies may be secured and used by the proposed project from exchange and transfer programs. These programs will substantially augment and diversify the water supplies available for recharge at the proposed project. These other water supply programs will include mutually beneficial exchanges with CVP Contractors and SWP Contractors to regulate the Contractor's wet-year supplies for use during dry years, while leaving a portion of the water behind in the proposed project. Rosedale currently has similar CVP contractor programs with Delano Earlimart Irrigation District, Arvin-Edison Water Storage District, and Kern-Tulare Water District, all long-term banking partners of Rosedale which make use of existing water banking facilities. The proposed project can secure approval of these exchanges by collaborating with Reclamation and the benefiting CVP Contractor(s). Rosedale and IRWD each have other water supply programs with SWP Contractors. The proposed project could secure approval of new programs with SWP Contractors by collaborating with the California Department of Water Resources (DWR), Kern County Water Agency, Metropolitan Water District of Southern California and the benefiting SWP Contractors.

IRWD currently purchases imported surface water supplies for its service area from Metropolitan Water District of Southern California (MWD), a SWP contractor. MWD surface water is provided to IRWD through the Municipal Water District of Orange County (MWDOC), a regional wholesale member agency of MWD that re-sells water to IRWD and other MWDOC member agencies. MWD sells water under a variety of terms and conditions and at different prices reflecting these conditions. With MWD approval, IRWD could take delivery of water purchased from MWD through MWDOC for storage in the proposed project and later recovery for use by IRWD. IRWD could also purchase surplus water supplies when approved and available from MWD through MWDOC for delivery to the proposed project.

2.4.3 Recovery Facilities

The proposed project would construct up to 12 extraction wells, with an anticipated annual total recovery capacity of up to 50,000 AF. Each well would be designed to pump groundwater at a recovery rate of approximately 5 to 6 cubic feet per second (cfs). Actual recovery rates for each well may be slightly more or less based on aquifer conditions at each well site. If higher production is achieved for the first few wells installed, fewer wells may be needed. Additionally, if any agricultural wells exist on the recharge basin sites, these could potentially be used as production wells or monitoring wells. The proposed recovery facilities would be designed and located to minimize potential effects on wells pumping on adjacent properties.

All extraction wells would be large-diameter (18 to 24 inches) steel-cased wells with completion intervals between approximately 200 and 900 feet below ground surface (bgs) and could be deeper depending on water quality and expected aquifer yield. Wellheads would consist of riser pipes, discharge pipes, wellhead motors, pumps, and other appurtenances. Wellheads would be protected by lockable, roofed, metal-mesh pump houses that are up to approximately 12 feet in height and constructed on square concrete pads. Typical wellhead facilities are shown in **Figure 2-3**.

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SOURCE: Irvine Ranch Water District, 2015

Kern Fan Groundwater Storage Project

Figure 2-3
Typical Recovery Facilities

ESA

Water conveyance piping ranging in size from 16 inches to 36 inches would be constructed to connect recovery wells to conveyance facilities delivering water to points of discharge in the Kern Fan Conveyance Facilities, California Aqueduct, Goose Lake Channel, or the CVC through the Rosedale Intake Canal.

Integrated Operation with Other Existing Extraction Facilities

The proposed project is intended to be integrated with Rosedale's Conjunctive Use Program. This integration is subject to the development and execution of an Agreement between Rosedale and IRWD detailing the terms and conditions of operational integration. The proposed project may provide flexibility for the Authority to integrate the operation of the project recovery facilities within the project area with other recovery facilities in Rosedale's Conjunctive Use Program, including other existing Rosedale facilities, and the Strand Ranch and Stockdale Projects' onsite and offsite facilities. Subject to existing mitigation requirements, as part of this project, to optimize operational flexibility of groundwater and facility management, Rosedale could recover groundwater on behalf of itself and/or IRWD, at any facility available to Rosedale within its Conjunctive Use Program.

2.4.4 Conveyance Facilities

The proposed project includes a new turnout, additional canals and/or pipelines, and pump stations (collectively the "Kern Fan Conveyance Facilities") to convey water to and from the California Aqueduct and proposed recharge and recovery facilities. The exact locations of the new conveyance facilities have not yet been determined but would have up to 500 cfs of conveyance capacity. Water would be conveyed to and from a new turnout at the California Aqueduct and a new conveyance system approximately 10 miles long that may include an open canal, closed conduit or some combination thereof. A typical turnout on the California Aqueduct is shown in **Figure 2-4**. Open channel construction may be concrete, shotcrete, high-density polyethylene (HDPE) or earth-lined, while closed-conduit materials may include reinforced-concrete pipe, HDPE, or cement-mortar-lined-and-coated steel pipe. In addition to a new conveyance, existing facilities within Rosedale's Conjunctive Use Program may be used to move water to/from the proposed project, subject to any necessary approvals, such as through the Friant-Kern Canal or the Kern River by exchange through the Goose Lake Channel, or from the CVC through the Rosedale Intake Canal. It is expected that the Kern Fan Conveyance Facilities could have siphon crossings at the following major locations depending on the final alignment:

- East Side Canal
- Kern Water Bank Main Canal
- West Kern Water District 36" DIP Transmission Main
- Stockdale Highway
- Kosareff Storage Yard & Residence

Typical Turnout Facilities on the California Aqueduct

Typical Pump Station Facilities

D190252.00

SOURCE: Rosedale-Rio Bravo Water Storage District, 2020

Kern Fan Groundwater Storage Project

Figure 2-4
Typical Conveyance Facilities

ESA

The Kern Fan Conveyance Facilities would have up to three pump stations along the alignment to lift water to the recharge basins. The proposed pump stations would be single-story buildings with a height of no more than 12 feet (see Figure 2-4). Each pump station would also include a gravity bypass line with slide gate into the pump station structure for the reverse flow of recovery water back to the California Aqueduct.

The proposed project would install a Supervisory Control and Data Acquisition (SCADA) communication system to aid in the operation of the new California Aqueduct turnout and other proposed project facilities. This would include programmable logic controllers (PLCs), radio communications, computer station at a central headquarters, and controls software programming.

Groundwater recovered from the project extraction wells would be conveyed through new or existing pipelines that would be below ground, running along the dirt roads between the recharge basins or buried in the basin bottoms, with exact locations subject to final well placement, similar to existing facilities constructed by Rosedale and IRWD for the Stockdale Project. The recovery pipelines would connect to the new Kern Fan Conveyance Facilities or could connect to the CVC via existing conveyance facilities.

2.5 Project Construction

2.5.1 Recharge Facilities

Recharge basins and conveyance facilities would be constructed on the Kern Fan Project Properties. Construction of the proposed recharge facilities would include the following phases: site clearing and demolition; excavation and stockpiling; construction of earthen berm levees and basins, cut-off walls, conveyance and transfer channels, rip-rap protection, and pipelines; and site restoration. The site clearing and demolition phase would include demolition of structures and existing irrigation piping systems onsite, as necessary. Up to 20 workers would be required on-site at one time to implement each construction phase. The staging areas, including construction parking, would be located on-site.

Recharge basins would be constructed by excavating and contouring each basin to a depth of up to approximately six feet, which allows for 1.5 feet of freeboard. The excavated soils would be used to form earthen berm levees to contain each basin. The basins would be connected by welded steel or concrete transfer structures with 24 to 72-inch diameter pipe culverts. Supply channels would be constructed by excavating below existing ground surface. Any necessary supply channels would be earthen or lined channels.

In addition, as described previously, the recharge basin design, subject to grant funding requirements, would be intended to create intermittent wetlands and bird habitat. The recharge basins may be constructed at multiple water depths to benefit both shorebirds and waterfowl. Shorebirds prefer mudflats to a depth of up to 6 inches with sparse vegetation (<40%) while waterfowl prefer depths of 6 inches to above 18 inches with a combination of open water and wetland cover; and dry land (berms or islands) is important for resting areas with dense vegetation (IRWD and Rosedale 2020). Subject to grant funding requirements, project berm and island banks would be built at a 4:1 slope with a minimum 1.5-foot freeboard, which would result

in at least a 6 to 10-foot-wide vegetative strip above the water line with vegetation extending into shallow water areas.

The recharge basins and supply channels would be designed in an effort to balance earthwork on site, such that all excavated soils are redistributed and utilized to construct the project facilities, requiring no imported materials and leaving no excess materials. Demolition and construction debris would be removed from the project site and transported to an appropriate landfill facility that accepts construction waste material.

2.5.2 Recovery Facilities

Up to twelve new recovery wells would be constructed on the Kern Fan Project Properties. On-site materials would be used to construct earthen well pads. Wells are anticipated to be 18 to 24 inches in diameter and would be drilled and constructed using a standard drill rig. The aboveground wellheads, motor control centers and pump houses would be installed and connected to transformers installed on the project sites. The recovery wells would be cased to approximately 900 feet bgs and equipped with vertical turbine pumps, 300 to 500 horsepower motors, discharge piping and electrical controls. The wells discharge piping will be connected to a conveyance system of underground pipelines to deliver pumped groundwater to the Kern Fan Conveyance Facilities. Installation of the recovery well conveyance system would require trenching to a depth of about 7 feet bgs. Construction staging would be located on-site.

2.5.3 Conveyance Facilities

The Kern Fan Conveyance Facilities would be constructed using typical open trench construction methods, with the exception of crossing Interstate-5 and other locations where siphons would be installed (see Section 2.4.4 above), where jack and bore methods would be used to tunnel under and avoid disruption of surface features. Excavation up to 22 feet deep would be required. Construction staging would be located on-site and/or on nearby temporary construction easements as necessary.

The proposed new turnout from the California Aqueduct would be constructed within the State of California right-of-way and subject to approval by DWR and KCWA. To avoid disruptions to the California Aqueduct operations, cofferdams would be required during turnout construction. Cofferdams are temporary watertight structures that would allow for a portion of the Aqueduct to be dewatered during construction of the turnouts and allow flows to continue passing through the Aqueduct channel. The pipelines leading from the turnout would be installed using open trench construction.

2.5.4 Construction Equipment

Construction of the proposed project would require heavy equipment onsite at the Kern Fan Project Properties. The final equipment requirements would be determined by the construction contractor but may include the following:

- Back hoes
- Front-end loaders
- 10-wheel dump trucks
- Cranes
- Compactor
- Water trucks
- Flat-back delivery truck
- Earth movers
- Bulldozers
- Excavators
- Drill rigs and tanks

2.5.5 Project Construction Schedule

Construction of the proposed facilities is anticipated to begin with Phase 1 in fall 2021, with the Phase 1 recharge facilities ready to receive water by 2022, subject to variation of the construction schedule. Construction of Phase 2 facilities is anticipated to begin in 2022. Construction of the project will be in multiple sequential or concurrent segments, each ranging from approximately 3 months to 40 months. The project is anticipated to be completed by fall 2026, subject to variations in the construction schedule.

2.6 Project Operation

The additional water stored in Kern County as a result of the proposed project would benefit water levels in the Kern County Sub-basin and help support groundwater sustainability. The groundwater basin in Kern County is operated such that a portion of banked groundwater is not recovered by the banking entity (referred to as "losses") and remains in the ground to bolster local groundwater levels. As part of the Feasibility Study for the proposed project, a model analysis was completed to quantify the potential groundwater level benefits from the project (Appendix I in Rosedale and IRWD, 2020: Thomas Harder & Co 2018). The analysis concluded the proposed project would result in measurable increases in groundwater elevations and therefore a groundwater level benefit.

2.6.1 Recharge

Rosedale would operate all recharge basins for the proposed project in a manner similar to existing basins in the Conjunctive Use Program. The recharge basins would be filled when water supplies become available, which could be highly variable from year to year, as evidenced by fluctuations in water deliveries to the Conjunctive Use Program in the recent past. For example, in 2008, there were no water deliveries for banking in Rosedale's existing program, while in 2011, banking water deliveries totaled approximately 245,000 AF for recharge. In years when water is available, it is estimated that active recharge operations could occur for as few as one to as many as twelve months per year.

Since the proposed project facilities would be integrated into Rosedale's Conjunctive Use Program, water for the proposed project may be recharged offsite at other existing facilities to facilitate effective resource management within Rosedale's service area.

The proposed recharge basins would typically hold water from 1 month upwards to 12 months. As a result, the proposed project would create incidental intermittent wetlands during recharge for periods of up to 12 months. Specific features would be incorporated into the design, operation

and maintenance of the proposed recharge basins such that during the recharge periods, hydric soil conditions would form allowing for the development of habitat for shorebirds and migratory birds.

During periods that the proposed project is not used for recharge, the intermittent wetlands would dry out, and as described below in Section 2.7, the recharge basins would be managed to allow agricultural land uses (e.g., annual farming or grazing) to continue when the basins are empty.

2.6.2 Recovery

The proposed project would provide flexibility for Rosedale to pump from any combination of the proposed project's wells and other wells within the Conjunctive Use Program (including the Strand Ranch and Stockdale West project wells) to meet recovery obligations for the Authority. Extraction for the proposed project would be limited to the amount previously recharged less losses, as specified by applicable MOUs.

In-Lieu Recovery by Exchange

In addition to direct recovery through extraction, Rosedale could recover the banked water by way of exchange. An exchange in-lieu of recovery may be accomplished through the use of SWP or other supplies through various water management programs and/or other surface supplies available. For example, Article 21 water stored in IRWD's portion of the project could be recovered for irrigation use within Rosedale's service area, and in exchange, Rosedale could request KCWA to ask DWR to deliver an equivalent amount of SWP Table A water to Metropolitan for IRWD's use instead of to Rosedale. The exchange of surface supplies shall be subject to the approval of those entities with discretionary authority over such supplies.

Recovery Scenarios

Rosedale could recover water from the proposed project as needed to meet existing or future commitments under its Conjunctive Use Program. It is expected that banked supplies would be recovered for IRWD when needed to return water to its program partners and during times when IRWD's imported and/or local supplies are interrupted or curtailed. IRWD's participation in the proposed project recognizes IRWD's need, in the event of a water shortage, for additional storage and recovery capacity to provide for improved reliability and redundancy in its supplies.

2.6.4 Conveyance

Recharge

As mentioned above, water would be conveyed to the proposed project's recharge facilities as available, via the Kern Fan Conveyance Facilities. In addition to a new conveyance, existing facilities within Rosedale's Conjunctive Use Program may be used to move water to/from the proposed project, subject to any necessary approvals, such as through the Friant-Kern Canal or the Kern River by exchange through the Goose Lake Channel, or from the CVC through the Rosedale Intake Canal and a new interconnection pipeline. The Kern Fan Conveyance Facilities could include connections to other facilities integrated into Rosedale's Conjunctive Use Program subject to any necessary agreement IRWD, Rosedale and with the Authority.

Recovery

Water recovered from the proposed extraction wells would be conveyed via the new Kern Fan Conveyance Facilities, or any other available facility, for subsequent conveyance to IRWD, IRWD's program partners, and Rosedale's program partners. Before introduction of pumped groundwater into the California Aqueduct, the Authority would comply with any existing DWR water quality policy provisions for introduction of local water into the California Aqueduct and the current water quality criteria in effect at the time of delivery.

The State Water Contractor that imports water for IRWD's service area is MWD. MWD would access water from the California Aqueduct at Lake Perris, where it could be conveyed to IRWD through an existing turnout. For example, water could be delivered to MWD's Diemer Filtration Plant located north of Yorba Linda or delivered untreated to Irvine Lake through the Santiago Lateral. The two major pipelines that deliver water from the Diemer Filtration Plant to the IRWD service area are the Allen McColloch Pipeline and the East Orange County Feeder No. 2. Water delivered to IRWD by MWD could occur by exchange.

Imported water is provided to IRWD through MWDOC, the regional wholesale member agency of MWD. In 2011, IRWD, MWD and MWDOC entered into a Coordinated Operating, Water Storage, Exchange and Delivery Agreement to facilitate delivery of SWP water banked at Strand Ranch to IRWD's service area. The Agreement could be amended, as needed, to include the proposed project as well. Under the Agreement, IRWD can provide banked water to MWD in the California Aqueduct at a Kern County delivery point. In exchange, MWD would provide IRWD with an equal amount of water at a delivery point in its service area. IRWD and MWD would execute a wheeling agreement to facilitate the recovery and delivery of non-SWP water from the project to IRWD's service area. Such deliveries would occur through the wheeling service provisions of MWD's Administration Code.

2.6.5 Energy Consumption

The majority of project operational activity would be passive, gravity driven movement of water through pipes and basins. However, the proposed project includes pump stations and recovery wells that would be powered by the existing electrical grid. The Kern Fan Conveyance Facilities include up to three pump stations to lift water approximately 10 feet from the California Aqueduct to the Phase 1 and Phase 2 recharge and recovery facilities. Recharge capacity for the proposed project is estimated to be upwards of 100,000 AFY. To achieve this amount of recharge, under conditions where source waters could not be conveyed via gravity, each pump station operating at approximately 30 kwh/AF would result in up to approximately 3,000,000 kilowatt hours per year (kwh/year), for a total of up to 9,000,000 kwh/year for all three pump stations combined. This energy requirement would be as-needed when Article 21 supplies are available and thus intermittent, rather than permanent and sustained. Energy use by the pumping stations during a diversion event was estimated to require approximately 7,680,000 kwh over a 4-month diversion period (Dee Jaspar and Associates, Inc., March, 2020).

Recovery wells also would be powered by the existing electrical grid. Recovery wells typically would operate at approximately 600 kwh/AF. Based on this, to achieve recovery of approximately 50,000 AFY, up to approximately 30,000,000 kwh/year would be required. Recharge and recovery operations are not expected to occur simultaneously, and during some periods neither recharge nor recovery would be occurring.

2.6.6 Operating Plans

As described in Chapter 1, *Introduction and Project Background* the proposed project would be operated in accordance with the two Memoranda of Understanding Regarding Operation and Monitoring of the Rosedale-Rio Bravo Water Storage District Groundwater Banking Program (MOUs), Rosedale's Long Term Operations Plan and the Project Recovery Operations Plan. Additionally, the parties anticipate an agreement between the Authority and Rosedale for integration of the proposed project into the Rosedale Conjunctive Use Program. These are described in Chapter 1 and provided in **Appendix B**.

2.7 Maintenance

The recharge and recovery facilities would require maintenance similar to the existing facilities in Rosedale's Conjunctive Use Program. Rosedale would be responsible for the maintenance of all proposed facilities for the duration of the proposed project. Weed and pest control operations would be conducted as necessary, utilizing products approved for aquatic use in order to protect and preserve groundwater quality. Periodic earthwork operations would be required to maintain levees, enhance soil permeability, and remove vegetative growth. Earthwork would involve disking or scraping the basins to remove the top layer (e.g., one inch) of sediment, approximately once every three years. Earthwork equipment could include graders, loaders, and tractors (110-HP light motor). Maintenance would redistribute soils on-site and would not require off-site soil removal or disposal.

Agricultural land uses, such as annual farming, grazing, or fallowing, would be allowed within the basins when the properties are not needed for water recharge or water management purposes. Grazing could be used to remove or control vegetative growth. The transport, use, and disposal of fertilizers and pesticides associated with agricultural activities at the proposed project's recharge sites would be done in accordance with applicable regulatory requirements, including the California Department of Pesticide Regulation's restrictions on pesticide use within artificial recharge basins and around wellheads. All agricultural users of the property would be prohibited from using chemicals that have been designated or suspected of having the potential to pollute groundwater, as determined by the manufacturer of the chemicals, California Department of Pesticide Regulation, California Environmental Protection Agency, the United States Environmental Protection Agency, or any other legal entity having jurisdiction over such matters. Use of pesticides and other chemicals in accordance with such regulatory restrictions would protect groundwater quality.

2.8 Project Approvals

As Lead Agency, the Authority may use this EIR to approve the proposed project, make Findings regarding identified impacts, and if necessary, adopt a Statement of Overriding Considerations regarding these impacts. The proposed project would proceed upon certification of this EIR by the Authority's Board of Directors, adoption of this EIR by both Rosedale's and IRWD's Board of Directors (as Responsible Agencies), and approval of the proposed project by the Authority.

Other approvals required may include the following:

- Appropriative Water Rights Holders: Use or transfer of pre-1914 or post-1914 appropriative water rights
- State Water Resources Control Board: Transfer of post-1914 appropriative water rights
- California Water Commission: WSIP funding
- California Department of Fish and Wildlife: Agreement for administration of ecosystem benefits associated with WSIP funding.
- Regional Water Quality Control Board: Storm Water Pollution Prevention Plans
- Kern County Water Agency: Approval for construction and operation of a new turnout on the California Aqueduct
- Department of Water Resources:
  - Approval for use of the California Aqueduct to convey water;
  - Agreement authorizing the construction and operation of a new turnout on the California Aqueduct;
  - Agreement facilitating the 1-for-1 exchange of Table A water held in Lake Oroville as SWP Project Water for Article 21 water held in the Kern Fan Groundwater Storage Project Ecosystem Account;
  - Agreement to coordinate the emergency response benefits associated with the WSIP funding.
- MWD: Approval to deliver, exchange, and convey water
- Kern County Roads Department: Easements for pipeline and canal crossings
- County of Kern: Well permits from the County of Kern Environmental Health Division
- California Department of Transportation: Encroachment permit for construction of syphon under Interstate-5
- Kern Fan Conveyance Easements: Temporary and permanent easements for pipeline
- Bureau of Reclamation:
  - Friant 215 Contract;
  - Agreement to deliver water to federal wildlife refuges.

2.9 References

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CHAPTER 3
Environmental Setting, Impact Analysis, and Mitigation Measures

3.0 Introduction to the Analysis

In compliance with *CEQA Guidelines* Section 15125 and 15126, Chapter 3 of this Draft EIR provides an analysis of the potential significant environmental effects of the Kern Fan Groundwater Storage Project (proposed project) with respect to existing baseline conditions. The following environmental topics are assessed in detail in this chapter in accordance with *CEQA Guidelines* Appendix G:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

The *CEQA Guidelines* Section 15128 requires that an EIR "contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and therefore were not discussed in detail in the EIR." The following environmental topics from *CEQA Guidelines* Appendix G are not discussed in detail in this Draft EIR because no significant impacts would occur as a result of implementation of the proposed project:

- Recreation
- Population and Housing
- Public Services

The effects found not to be significant associated with these environmental topics are explained further below in Section 3.0.2, *Effects Found Not to Be Significant*.

3.0.1 Format of the Environmental Analysis

This Draft EIR provides analysis of impacts for those environmental topics where it was determined in the NOP, or through subsequent analysis, that the proposed project would result in potentially significant effects. "Significant effect" is defined by *CEQA Guidelines* Section 15382 as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant."

Sections 3.1 through 3.17 discuss the environmental impacts that may result with approval and implementation of the proposed project. The format of the environmental analysis for each environmental topic included in Sections 3.1 through 3.17 includes an environmental setting, regulatory setting, and impact analysis and mitigation measures (if required).

Environmental Setting and Baseline

The assessment of each environmental topic begins with the relevant baseline setting information that is needed to provide context for the impact analysis that follows. Extraneous setting information that does not shed light on the impact analysis is not included in this Draft EIR (*CEQA Guidelines* Section 15125(a)).

In accordance with *CEQA Guidelines* Section 15125(a), the environmental setting contains a description of the regional and local physical environmental conditions in the project vicinity at the time of the publication of the NOP. This environmental setting constitutes the baseline physical condition against which the implementation of the proposed project is assessed in order to determine whether a significant environmental impact would occur (*CEQA Guidelines* Section 15126.2(a)).

Regulatory Setting

Where the project area and its surroundings fall within the jurisdiction of federal, State, and local regulatory agencies, the proposed project would be subject to the laws, rules, regulations, and policies of those agencies. These regulations are intended to guide development, reduce adverse effects on sensitive resources, and/or offer general guidance on the protection of such resources. The regulatory setting summarizes the applicable laws, rules, regulations, and policies for the proposed project. These rules may also set the standards, in the form of significance criteria or thresholds of significance as discussed below, by which the potentially significant impacts of the proposed project are evaluated.

Impact Analysis and Mitigation Measures

Significance Criteria and Methodology

This Section presents the significance criteria against which potential impacts are evaluated. As defined by *CEQA Guidelines* Section 15064.7(a), thresholds of significance are an identifiable

quantitative, qualitative, or performance standard for the assessment of a particular environmental impact. Significance criteria are included for each environmental topic.

Determining the severity of project impacts is fundamental to achieving the objectives of CEQA. The level of significance for each impact examined in this Draft EIR was determined by considering the predicted magnitude of the impact to baseline environmental conditions against the applicable threshold. Thresholds were developed using criteria from the *CEQA Guidelines* and Appendix G Checklist.

Impact Analysis

This Section provides an analysis of the potential environmental impacts that could result from implementation of the proposed project. This Draft EIR addresses the direct, indirect, and cumulative impacts associated with implementation of the proposed project, including short-term and long-term impacts. The impact analysis may include a summary or description of methodologies used.

The level of significance for each environmental impact examined in this Draft EIR is determined by considering the predicted magnitude of the impact in relation to the baseline environmental setting and assuming implementation of applicable regulatory requirements, measured against the significance criterion. Based on the significance criterion, the significance of each potential environmental impact is determined according to the following categories:

- **Significant and Unavoidable**: A significant and unavoidable impact is a substantial adverse effect on the environment that cannot be reduced to below a significance threshold given reasonably available and feasible mitigation measures. A project with significant and unavoidable impacts could still proceed, but Rosedale and IRWD would be required to prepare a Statement of Overriding Considerations, pursuant to *CEQA Guidelines* Section 15093, explaining why the agencies would proceed with the project in spite of the potential for a significant environmental impact. In addition, *CEQA Guidelines* Section 15126.6 requires an analysis of project alternatives, including the no-project alternative as well as other feasible alternatives, that would avoid or substantially lessen any of the significant effects of a project.
- **Less-than-Significant Impact with Mitigation:** A potentially significant impact occurs if the proposed project could result in a potentially substantial adverse change in the physical conditions of the environmental topic being evaluated. If such a determination is made, reasonably available and feasible mitigation measures must be considered if they would avoid or substantially reduce the significant impact. An impact that can be reduced to below the significance threshold with such mitigation measures is considered less than significant with mitigation. Such an impact requires findings to be made under Section 15091 of the *CEQA Guidelines*.
- **Less-than-Significant Impact:** A less-than-significant impact is an impact that may be adverse, but does not exceed the significance threshold and does not require mitigation measures. However, mitigation measures that could further lessen the environmental effect may be suggested if readily available and easily achievable.
- **No Impact:** A no impact determination would occur if the project would not result in a substantive change to the environmental topic that is being evaluated.

- **Beneficial Impact**: An effect that would enhance existing environmental conditions or reduce existing environmental problems or hazards.

Mitigation Measures and Significance Determination

Mitigation measures are recommended for any identified potentially significant impacts as a result of the proposed project. The significance determination provides the level of significance after the implementation of recommended mitigation measures, if applicable, based on the categories described above.

3.0.2 Effects Found Not to Be Significant

Recreation

The proposed project would not 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.

Kern County Parks and Recreation, and the City of Bakersfield Department of Recreation and Parks maintain the local parks and provide recreational services for the project area. The nearest recreational facilities are located in the City of Bakersfield (City of Bakersfield 2020; County of Kern 2020). The proposed project would not directly introduce new residents within the project area. Therefore, the proposed project would not increase the use of these existing recreational facilities within the project area and would result in no impact to the physical deterioration of recreational facilities.

The proposed project would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

The implementation of the proposed project would not require recreational facilities to serve the project. Therefore, the proposed project would not result in an adverse physical effect on the environment from the construction or expansion of additional recreational facilities because the proposed project would not require recreational facilities.

Population and Housing

The proposed project would not induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).

Implementation of the proposed project would not have a direct growth inducement effect, as it does not propose development of new housing that would attract additional population to the area. Further, implementation of the proposed project would not result in substantial permanent employment that could indirectly induce population growth. Although construction activities would create some short-term construction employment opportunities over the duration of construction, the amount of opportunities created would not require persons outside of the Kern County workforce. Further, up to 3 to 5 new permanent employees would be required to operate the proposed recharge, recovery, and Kern Fan Conveyance Facilities. These new Rosedale

employees also are anticipated to come from the existing County workforce. As described in Section 5.4 of this Draft EIR, the proposed project would not directly induce substantial unplanned population growth; there would be no impact. The impacts of planned growth under existing, adopted land use plans has previously been analyzed in CEQA reviews completed by county and city land-use agencies with jurisdiction over land uses within the service areas of Rosedale and IRWD.

Please refer to Chapter 5, *Growth Inducement* of this Draft EIR for a discussion of the potential for the proposed project to indirectly induce substantial unplanned population growth.

The proposed project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

The project area is rural and includes various rural residences throughout the project area amongst the agricultural fields and roadways. However, no residences would be condemned or displaced by the proposed project construction or operation activities. Therefore, the proposed project would not displace people or housing necessitating the construction of replacement housing elsewhere. There would be no impact.

Public Services

The proposed project would not 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 following public services:

Fire Protection.

The proposed project would be implemented in the County of Kern. The Kern County Fire Department provides fire protection and emergency services in the vicinity of the project area (Kern County Fire Department 2020). The nearest station to the project site is Station 67 located at 14341 Brimhall Road in Bakersfield. The proposed project would not change existing demand for fire protection services because construction activities would not result in a permanent increase of employees or population to the project area. The proposed project would not substantially increase the need for new fire department staff or new facilities.

Police Protection.

The Kern County Sheriff's Office provides police protection services to the project area (Kern County Sheriff's Office 2020). The Bakersfield Police Department also provides services to the project area (City of Bakersfield 2020a). The project area is located close to both the Kern County Sherriff's Office in Buttonwillow, and the City of Bakersfield Westside Police Station. The proposed project does not include new homes or businesses that would require any additional services or extended response times for police protection services beyond those required with the existing on-site uses. Therefore, the Kern County Sheriff's Office and Bakersfield Police

Department would not be required to expand or construct new police stations to serve the proposed project.

Schools

The project area lies within the Bakersfield School District (Bakersfield School District 2020). The student generation rates or enrollment numbers within Bakersfield School District would not be affected or altered by the proposed project. As such, the proposed project would not require new or expanded school facilities.

Parks

The proposed project would not result in the construction of new public parks, or require the alteration of existing public parks. The project area is located in a rural area primarily used for agricultural production and oil production. Implementation of the proposed project would not construct facilities on land used for recreational purposes. The project would not require new parks in order to maintain service ratios.

Other Public Facilities

The proposed project would not require or impact other additional public facilities. No impacts would occur because new public facilities would not be needed.

3.0.3 Cumulative Impact Methodology

As indicated above, in addition to direct and indirect impacts associated with implementation of the proposed project, this Draft EIR also includes an assessment of cumulative impacts for each environmental topic evaluated in Chapter 3. The cumulative effects of implementing the proposed project in combination with other past, present, and reasonably foreseeable future projects within and around the project site are considered. The analysis of cumulative impacts considers whether other projects could cause related environmental impacts similar to the environmental impacts anticipated to occur due to the proposed project.

CEQA Guidelines Section 15130 requires that an EIR shall discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." "Cumulative impacts" are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" [*CEQA Guidelines*, Section 15355; see also *Public Resources Code*, Section 21083(b)]. Stated another way, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts" [*CEQA Guidelines*, Section 15130(a)(1)]. The definition of cumulatively considerable is provided in Section 15065(a)(3):

> *Cumulatively considerable 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.*

According to Section 15130(b) of the *CEQA Guidelines*:

> *[t]he discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.*

For the purposes of this Draft EIR, the proposed project would contribute to a cumulatively considerable and, therefore, significant cumulative impact if:

- The cumulative effects of other past, current, and probable future projects without the proposed project are not significant and the proposed project's incremental impact is substantial enough, when added to the cumulative effects, to result in a significant impact.
- The cumulative effects of other past, current, and probable future projects without the proposed project are already significant and the proposed project would result in a cumulatively considerable contribution to the already significant effect. The standards used to determine whether the contribution is cumulatively considerable include the existing baseline environmental conditions and whether the proposed project would cause a substantial increase in impacts or otherwise exceed an established threshold of significance.

Geographic Scope of Cumulative Impacts

The geographic area affected by the proposed project and the proposed project's potential to contribute to cumulative impacts varies based on the environmental topic being analyzed. Generally, the geographic area associated with the environmental effects of the proposed project, as described further in this Chapter 3, inform the boundaries of the area used for compiling the list of past, present, and reasonably-foreseeable future related projects considered in the cumulative impact analysis.

Temporal Scope of Cumulative Impacts

The cumulative projects considered in this analysis include those that have recently been completed, are currently under construction, or are reasonably foreseeable (e.g., for which an application has been submitted). A project's schedule is relevant to the consideration of cumulative short-term construction-related impacts and long-term operational impacts. For future cumulative projects, implementation schedules are often broadly estimated and can be subject to change. However, for purposes of evaluating both short-term and long-term cumulative impacts of the proposed project, this analysis assumes future cumulative projects would be implemented concurrently with the proposed project.

Method of Analysis

CEQA Guidelines Section 15130 provides that the following approaches can be used to adequately address cumulative impacts:

- Regional Growth Projections Method — 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. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.
- List Method — A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the lead agency.

For this Draft EIR, the list method is used; and consistent with CEQA, a two-step approach was used to analyze cumulative impacts. The first step was to determine whether the combined effects from the proposed project and cumulative projects would be cumulatively significant. This was done by adding the proposed project's incremental impact to the anticipated impacts of other probable future projects and/or reasonably foreseeable development. Where the combined effect of the projects and/or projected development was determined to result in a significant cumulative effect, the second step was to evaluate whether the proposed project's incremental contribution to the combined significant cumulative impact would be cumulatively considerable, as required by *CEQA Guidelines* Section 15130(a).

CEQA Guidelines Section 15064(h)(4) states that:

> *… [t]he mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable.*

Therefore, it is not necessarily true that, even where cumulative impacts are significant, any level of incremental contribution must be deemed cumulatively considerable by the lead agency. In addition, if the proposed project's individual impact is less than significant, its contribution to a significant cumulative impact could also be deemed cumulatively considerable, depending on the nature of the impact and the existing environmental setting. If, for example, a project is located in an air basin determined to be in extreme or severe nonattainment for a particular criteria pollutant, a project's relatively small contribution of the same pollutant could be found to be cumulatively considerable. Thus, depending on the circumstances, an impact that is less than significant when considered individually may still be cumulatively considerable in light of the impact caused by all projects considered in the analysis.

List of Cumulative Projects

Cumulative effects could result when considering the effects of the proposed project in combination with the effects of other projects in the area. For this Draft EIR analysis, other past, present, and reasonably-foreseeable future projects have been identified, as well as existing and future water banking programs for the water districts in the Kern Fan area. **Table 3-1** lists the water banking programs, and the associated districts are shown in Figure 3.10-1 in Section 3.10,

Hydrology and Water Quality. **Table 3-2** lists specific projects that are included in the analysis of cumulative impacts. **Figure 3-1** graphically displays the location of these cumulative projects.

TABLE 3-1
GROUNDWATER BANKING PROGRAMS IN KERN COUNTY

Project	Type	Approximate Gross Area of District (Acres)
Semitropic Water Storage District	In Lieu/Direct Recharge Projects	221,000
Arvin Edison Water Storage District	In Lieu/Direct Recharge Projects	130,000
Rosedale Rio Bravo Water Storage District	In Lieu/Direct Recharge Projects	44,000
Buena Vista Water Storage District	In Lieu/Direct Recharge Projects	50,000
Kern Delta Water Storage District	In Lieu/Direct Recharge Projects	125,000
Cawelo Water District	In Lieu/Direct Recharge Projects	45,000
Berrenda Mesa Water District	Direct Recharge Projects	369
City of Bakersfield, 2800 Acres	Direct Recharge Projects	2,760
Kern County Water Agency Pioneer Project	Direct Recharge Projects	2,250
Kern Water Bank	Direct Recharge Projects	20,500
West Kern Water District/Buena Vista WSD	Direct Recharge Projects	2,000
North Kern Water Storage District	Direct Recharge Projects	75,000

SOURCES: Kern County Water Agency, Buena Vista Water Storage District, Rosedale Rio Bravo Water Storage District, Kern Delta Water District.

TABLE 3-2
PROJECT LIST FOR ANALYSIS OF CUMULATIVE IMPACTS

Project No.	Lead Agency	Name	Location	Project Type	Project Description	Status
1	City of Bakersfield	Thomas Roads Improvement Program	Bakersfield, CA	Development and Management Plan	The Thomas Roads Improvement Program (TRIP) is a cooperative effort between the City of Bakersfield, County of Kern, Caltrans, and the Kern Council of Governments. TRIP projects have been identified as necessary to relieve the stress on outdated infrastructure caused by years of rapid growth in population, inter-regional travel, and freight movement. The projects will facilitate regional mobility, economic growth and development, as well as reduce travel time through major transportation corridors.	Under construction
2	City of Bakersfield	SR 43/Stockdale Highway Roundabout Project	Bakersfield, CA	Roadway Improvement	This project will replace an existing 4-way stop with a roundabout at the State Route 43 (Enos Lane) and Stockdale Highway intersection. Work is nearing completion. The top lift of asphalt .and final striping are planned for May 2020	Under construction
3	Rosedale-Rio Bravo Water Storage District	Drought Relief Project	Bakersfield, CA	Groundwater Banking and Recovery	Rosedale is currently working on the Drought Relief Project which includes 230 acres of new recharge ponds, 32,500 feet of pipeline, wells, a pump station, and a new Cross Valley Canal turn-out. These facilities will provide much needed recharge, conveyance and recovery capacity.	Under construction
4	Rosedale-Rio Bravo Water Storage District	West Basin Improvement Project	Bakersfield, CA	Groundwater Recharge Facilities	The West Basins Improvement Project is the improvement of existing recharge ponds and development of an additional 50-acre project west of Bakersfield designed to recharge, store and recover water to provide a cost-effective and reliable water supply for landowners within Rosedale's service area. Rosedale purchased the properties in 2009-2015. This project has the potential to recharge up to 5,000 AF of water in wet years. This could provide Rosedale with up to 1,000 AFY.	Project construction was completed in 2016.

TABLE 3-2 (CONTINUED)
PROJECT LIST FOR ANALYSIS OF CUMULATIVE IMPACTS

Project No.	Lead Agency	Name	Location	Project Type	Project Description	Status
5	Rosedale-Rio Bravo Water Storage District	Stockdale Integrated Banking Project	Unincorporated Kern County.	Groundwater Recharge, Storage, and Recovery Facilities.	As explained in Chapter 1, recharge capacities for the Stockdale Properties are estimated to be approximately 27,100 AFY for Stockdale West and approximately 19,000 AFY for Stockdale East. Recovery facilities were designed to extract approximately 11,250 AFY at Stockdale West and approximately 7,500 AFY at Stockdale East.	Final EIR completed November 2015. Stockdale East expected to be operational in 2020.
6	Rosedale-Rio Bravo Water Storage District	Western Rosedale In-Lieu Service Area Project and Westside Recharge Ponds Expansion	Western Rosedale	Water Conveyance Pipelines, Recharge Facilities	The Project includes construction and operation of approximately ten miles of water conveyance, pipelines and appurtenant facilities (including pumps, valves, flow meters, air vents, and connections to existing facilities) and construction and operation of two groundwater recharge ponds (totaling approximately 55 acres and located directly adjacent to Rosedale's existing Westside Recharge Ponds). Operation of the Project includes provision of water through proposed facilities and groundwater recharge via percolation into an existing sump. Operation of the Project facilities will increase Rosedale's ability to recharge water by up to 15,000 AFY (including 10,000 AF through in-lieu recharge).	NOD filed in November 2014. Portion of Project facilities have not been built yet.

TABLE 3-2 (CONTINUED)
PROJECT LIST FOR ANALYSIS OF CUMULATIVE IMPACTS

Project No.	Lead Agency	Name	Location	Project Type	Project Description	Status
7	Rosedale-Rio Bravo Water Storage District	Onyx Ranch South Fork Valley Water Project	Kern River Valley	Kern River Water Diversion	The RRBWSD proposes to change the points of diversion and place of use for the 1914-water rights associated with the parcels on the project site so that the water can be delivered in the RRBWSD service area on the San Joaquin Valley floor and used for irrigation and groundwater recharge. The RRBWSD proposes to reduce the diversion and use of surface water on the project site by converting irrigated fields to non-irrigated pasture or native vegetation. With the proposed project, surface water that is diverted under the existing condition would remain in the South Fork of the Kern River and flow downstream.	Draft EIR published in May 2020
8	Kern Fan Authority	Kern Fan Authority Integration Project	Unincorporated Kern County; Bakersfield, CA	Groundwater Banking and Recovery	Reciprocal use of existing groundwater banking and recovery facilities and infrastructure among four districts: Rosedale; Kern Delta Water District, Henry Miller Water District, and Buena Vista Water Storage District.	Negative Declaration adopted and NOD issued in January 2020
9	City of Bakersfield	McAllister Ranch Groundwater Banking Project	Bakersfield, CA	Groundwater Banking and Recovery	Construction and operation of shallow recharge ponds totaling ~1,400 acres, water conveyance facilities, and up to 14 groundwater wells and well pumping plants to store water and pump it in times of surplus. The project applicant is Buena Vista Water Storage District.	Notice of Preparation (NOP) was released on June 12, 2020. Operations expected to begin in 2025.
10	Kern Water Bank Authority (KWBA)	Conservation and Storage Project	Unincorporated Kern County, CA; the Kern Water Bank (KWB) is located at the downstream reach of the Kern River. The project is bounded by Stockdale Highway to the north, State Route 119 to the south, and is bisected by Interstate Highway 5.	Groundwater Banking of Kern River Water	The project would directly divert up to 500,000 AF of water per year from the Kern River for recharge and storage within the KWB through existing diversion works and recharge facilities located on the KWB lands, and/or to deliver water directly to KWBA's participating members' service areas via the KWB Canal or Cross Valley Canal.	Final EIR completed November 2018 (litigation activities ongoing) Water Rights Application 31676 is pending before SWRCB.

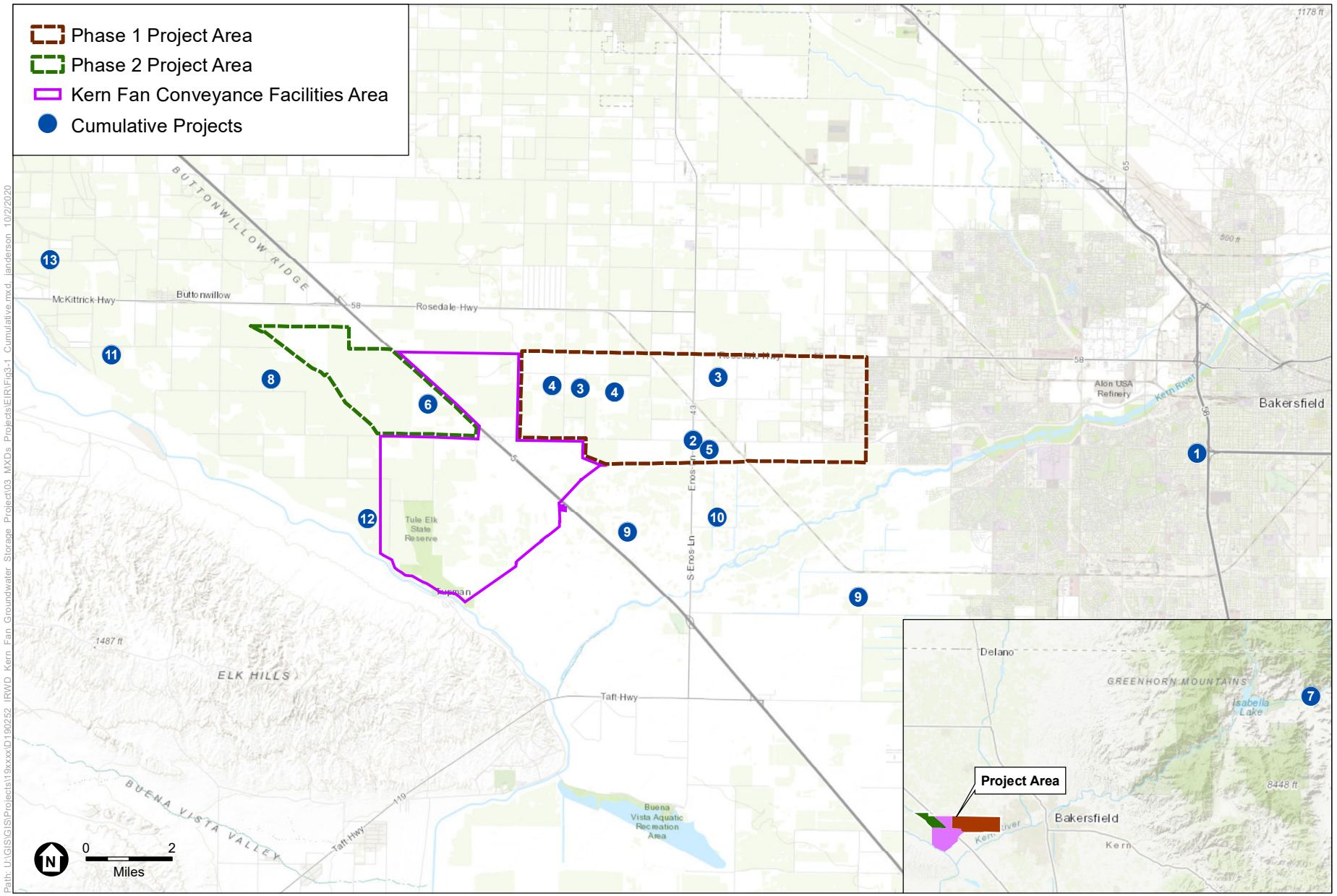
TABLE 3-2 (CONTINUED)
PROJECT LIST FOR ANALYSIS OF CUMULATIVE IMPACTS

Project No.	Lead Agency	Name	Location	Project Type	Project Description	Status
11	California Department of Water Resources	San Joaquin Field Division Liner Raise and Instrumentation Project	Kings County and Kern County, CA. The project is located along the California Aqueduct, approximately 8 miles southwest of the town of Lost Hills.	California Aqueduct Repair and Maintenance	The Project would raise portions of the concrete liner of Pools 24 and 25 of the California Aqueduct for approximately 1.65 miles. The Project would also install of water level monitoring instrumentation to provide real-time monitoring of flow and water levels in Pools 22 and 25. These pools are located along the Aqueduct in Kings and Kern Counties between Aqueduct MP 175.16 (Pool 22) approximately 2 miles southwest of the town of Kettleman City and MP 213.00 (Pool 25)	Final IS/MND published in July 2020.
12	Buena Vista Water Storage District	Palms Groundwater Banking Project	Unincorporated Kern County, CA	Groundwater Banking and Recovery	Initial construction of the recharge portion of the project was completed in 2016. The recharge ponds are approximately 1,150 acres. To date, the District has recharged approximately 27,166 acre-feet of surplus water in the Palms Project, 14,164 acre-feet in 2017 and 13,002 acre-feet in 2019. High quality water recharged at the Palms Project flows to aquifers that are sources for domestic and municipal wells providing water to residents of Taft, Tupman, and to the disadvantaged community of Buttonwillow, and replenishes groundwater under the Tule Elk Reserve. The proposed Groundwater Recovery Project would include 14 wells (9 new and 5 replacement wells) and conveyance facilities, connecting to the District's existing turnout BV8 at the California Aqueduct. The Project capacity is anticipated to be 100,000 AFY for recharge and 25,000 AFY for recovery	An Initial Study/Mitigated Negative Declaration (IS/MND) (SCH # 2015121030) was prepared for the Palms Project in 2015, and the Notice of Determination was filed in January 2016. The Notice of Preparation (NOP) for the Groundwater Recovery portion of the project was released June 16, 2020.

TABLE 3-2 (CONTINUED)
PROJECT LIST FOR ANALYSIS OF CUMULATIVE IMPACTS

Project No.	Lead Agency	Name	Location	Project Type	Project Description	Status
13	Buena Vista Water Storage District	Corn Camp Groundwater Recharge Pond Project	Unincorporated Kern County, CA	Groundwater Recharge	Construction of a 50-acre recharge pond that would expose sand for percolation at 8 feet deep. Maximum recharge estimates, based on a full-year operation schedule, would average 24,500 AFY. Water from existing District sources would be delivered to the recharge pond via the existing Com Camp Canal and/or 7th Standard Pipeline. The District would also install a pump station and 30-foot-tall water storage tank.	IS/MND released June 4, 2020; NOD filed September 18, 2020

SOURCES: City of Bakersfield 2019, 2020b, 2020c; Rosedale-Rio Bravo Water Storage District 2015, 2020a, 2020b; DWR 2020; Buena Vista Water Storage District 2020a, 2020b; Kern Fan Authority 2019; Kern Water Bank Authority 2018; Kern Groundwater Authority 2020.



SOURCE: Mapbox.

Kern Fan Groundwater Storage Project

Figure 3-1

Cumulative Project Locations

ESA

3.0.4 References

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3.1 Aesthetics

This section addresses the potential aesthetic and visual impacts associated with construction and operation of the proposed project. This section includes: a description of existing visual resources and aesthetic conditions in the project area; a summary of applicable regulations related to aesthetics; and an evaluation of potential impacts on visual resources, including scenic vistas, and on the visual character and quality of the project area, including cumulative impacts.

3.1.1 Environmental Setting

Regional Setting

The proposed project would be located in western Kern County. The proposed facilities would be constructed on agricultural or vacant land within or near the Rosedale service area (Figure 2-1). Regional views for the unincorporated area of Kern County are characterized by flat plains with low-density communities, water conveyance infrastructure, oil extraction facilities, and agricultural land.

Visual Project Area

The proposed project consists of Phase 1 and Phase 2 areas as well as the area for the Kern Fan Conveyance Facilities (collectively referred to as the "project area"). The Phase 1 area contains a small southeastern portion of land within the City of Bakersfield (refer to Figure 2-1). The rest of the project area is located within unincorporated Kern County. Within the project area, the project proposes the construction of recharge basins, 12 recovery wells, and the Kern Fan Conveyance Facilities, which include canals and/or pipelines, pump stations and a new turnout at the California Aqueduct (Aqueduct). The project area is characterized as rural and is primarily comprised of parcels characterized by agricultural land use. Surrounding land uses consist of agriculture, road-side commercial zones, and low-density rural residential communities. The southwestern portion of the Phase 2 project area is adjacent to the Tule Elk State Natural Reserve. The project area includes existing water management facilities including: recharge basins, similar to the adjacent Kern Water Bank, which consist of basins and earthen berms of varying shape, size, and depth. Various areas within the project area also contain pipelines; pump stations; canals, and wells. **Figure 3.1-1** provides representative views of the project area. The proposed Kern Fan Conveyance Facilities could be located underground within dirt roads along and between and through agricultural fields, or could convey water through an open surface canal. The project area is generally flat, as is the surrounding area.

Current views from the project area are expansive agricultural fields and production facilities. The project area is adjacent to land that is characterized by irrigated agricultural fields in active cultivation and existing water recharge and conveyance facilities. There are sporadic clusters of residences amongst the agricultural land. Views in all directions are dominated by flat expanses of agricultural land and oil recovery structures. Looking southwest, distant views of the Elk Hills are visible from the project area on clear days.

PHOTOGRAPH 1: Typical View within the Phase 1 Project Area.

PHOTOGRAPH 2: Typical View within the Phase 2 Project Area.

PHOTOGRAPH 3: Typical View within the Kern Fan Conveyance Facilities Area.

PHOTOGRAPH 4: View of the Tule Elk State Reserve area.

D190252.00

SOURCE: ESA, 2020

Kern Fan Groundwater Storage Project

Figure 3.1-1
Typical Views of the Project Area

ESA

Scenic Vistas and Aesthetic Resources

Scenic vistas and viewscapes provide expansive views of distant landforms and aesthetic features from public vantage points, including areas designated as official scenic vistas along roadway corridors or otherwise designated by local jurisdictions. Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that contribute to the public viewer's experience and appreciation of the environment.[1] Depending on the extent to which a project's presence would alter the perceived visual character and quality of the environment, a visual or aesthetic impact may occur.

The project area is not designated as a scenic vista. However, distant views of the Elk Hills are visible from the project area. An expansive view of the Elk Hills would be considered a scenic vista visible from the project area. None of the roadways abutting the project area are considered scenic. Eligible State Scenic Highways within Kern County include State Route (SR) 58 between Mojave and Boron (70 miles from the project area), SR-41 (55 miles), SR-14, and State Highway 395 beginning north of Mojave and continuing to the Inyo County Line (65.84 miles), none of which are in the vicinity of the project area. The Kern County General Plan does not identify any aesthetic resources in the project vicinity (County of Kern 2009).

Visual Character

Visual character is a general description of the visual attributes of a particular land use setting as defined by local municipalities and other land use agencies. The purpose of defining the visual character of an area is to provide the context within which the visual quality of a particular site or locale is most likely to be perceived by the viewing public. For urban areas, visual character is typically described on the neighborhood level or in terms of areas with common land use, intensity of development, socioeconomic conditions, and/or landscaping and urban design features. For natural and open space settings, visual character is most commonly described in terms of areas with common landscape attributes (such as landform, vegetation, water features, etc.).

As described previously, the majority of the project area is flat, largely undeveloped, and comprised of agricultural uses with limited rural development. Water features in the general area include the Cross Valley Channel, the Kern River, the Kern River Channel, the Goose Lake Channel, and the California Aqueduct. Public views of the project area are available to motorists traveling along local roadways and dirt roads.

Light and Glare

Light originates from human activity from the following two primary sources: light emanating from building interiors that passes through windows, and light originating from exterior sources (e.g., street lighting, building illumination, security lighting, parking lot lighting, landscape lighting, and signage). These sources of light can be a nuisance to adjacent residential areas, diminish the view of the clear night sky, and if uncontrolled, can cause disturbances for motorists traveling in the area. Land uses such as residences and hotels are considered light sensitive, since occupants have

[1] *CEQA Guidelines*, Appendix G, Environmental Checklist Form defines public views as those that are experienced from a publicly accessible vantage point.

expectations of privacy during evening hours and may be subject to disturbances by bright light sources. Light spill is typically defined as the presence of unwanted light on properties adjacent to the property being illuminated.

Glare is caused by the reflection of sunlight or artificial light by highly polished surfaces such as window glass or reflective materials and, to a lesser degree, from broad expanses of light-colored surfaces or vehicle headlights. Perceived glare is the unwanted and potentially objectionable sensation as observed by a person as they look directly into the light source of a luminaire. Daytime glare generation in urban areas is typically associated with buildings with exterior facades largely or entirely comprised of highly reflective glass. Glare can also be produced during evening and nighttime hours by the reflection of artificial light sources, such as automobile headlights. Glare generation is typically related to either moving vehicles or sun angles, although glare resulting from reflected sunlight can occur regularly at certain times of the year. Glare-sensitive uses include residences and transportation corridors.

The existing project area contains facilities that do not contain any major light sources. The nighttime lighting environment mainly consists of vehicle headlights and scattered street lighting from commercial, recreational, and residential development. No glare is anticipated at nighttime. There are no other uses located near or adjacent to the project area that generate glare such as solar panels.

3.1.2 Regulatory Setting

Federal

National Scenic Byways Program

The National Scenic Byways program is part of the U.S. Department of Transportation, Federal Highway Administration. The program was established under the Intermodal Surface Transportation Efficiency Act of 1991 and was reauthorized in 1998 under the Transportation Equity Act for the 21st Century. Under the program, the U.S. Secretary of Transportation recognizes certain roads as National Scenic Byways or All-American Roads based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. The only National Scenic Byway located within Southern California is the Arroyo Seco Historic Parkway–Route 110 in Los Angeles County (Federal Highway Administration 2020).

State

California Scenic Highway Program

The State Scenic Highway Program, created by the California Legislature in 1963, was established to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to the highways. A highway is designated under this program when a local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation (Caltrans) for scenic highway approval, and receives notification from Caltrans that the highway has been designated as a scenic highway. When a city or county nominates an eligible scenic highway for official designation, it defines the scenic corridor, which is land generally adjacent and visible to a motorist on the highway (Caltrans 2020).

There are no designated State Scenic Highways within Kern County. However, three highway segments are potentially eligible for future designation as scenic highways:

- SR 41, in the far northwest corner of the County;
- SR 58, from SR 14 east; and
- SR 14/US 395, from SR 58 north.

Local

Kern County General Plan

The Kern County General Plan discusses specific goals and policies related to aesthetics and visual quality for areas within the Kern County area or its Sphere of Influence. The Kern County General Plan also has a Scenic Route Corridors Element that has been adopted. This General Plan Element does not identify the project area as a significant scenic resource. The following General Plan policies for visual resources and aesthetics are relevant to the proposed project (County of Kern 2009):

1.10.7 Light and Glare

> **Policy 47:** Ensure that light and glare from discretionary new development projects are minimized in rural as well as urban areas.
>
> **Policy 48:** Encourage the use of low-glare lighting to minimize nighttime glare effects on neighboring properties.

Chapter 19.81, Dark Skies Ordinance (Outdoor Lighting)

In November 2011, Kern County approved a Dark Skies Ordinance. The purpose of this ordinance is to maintain the existing character of Kern County by requiring a minimal approach to outdoor lighting, recognizing that excessive illumination can create a glow that may obscure the night sky and excessive illumination or glare may constitute a nuisance. The ordinance provides requirements for outdoor lighting within specified unincorporated areas of Kern County in order to accomplish the following objectives (County of Kern 2011):

- Objective 1: Encourage a safe, secure, and less light-oriented night-time environment for residents, businesses, and visitors.
- Objective 2: Promote a reduction in unnecessary light intensity and glare, and to reduce light spillover onto adjacent properties.
- Objective 3: Protect the ability to view the night sky by restricting unnecessary upward projections of light.
- Objective 4: Promote energy conservation and a reduction in the generation of greenhouse gases by reducing wasted electricity that can result from excessive or unwanted outdoor lighting.

Metropolitan Bakersfield General Plan

Portions of the project areas are located within the planning area of the Metropolitan Bakersfield General Plan. This General Plan discusses specific goals or policies related to aesthetics and visual quality for areas within the Metropolitan Bakersfield area or its Sphere of Influence (see **Figure 3.1-2**). The General Plan also contains a specific section that discusses the existing scenic resources located in the area. The following General Plan policies for visual resources and aesthetics are relevant to the proposed project (County of Kern 2007):

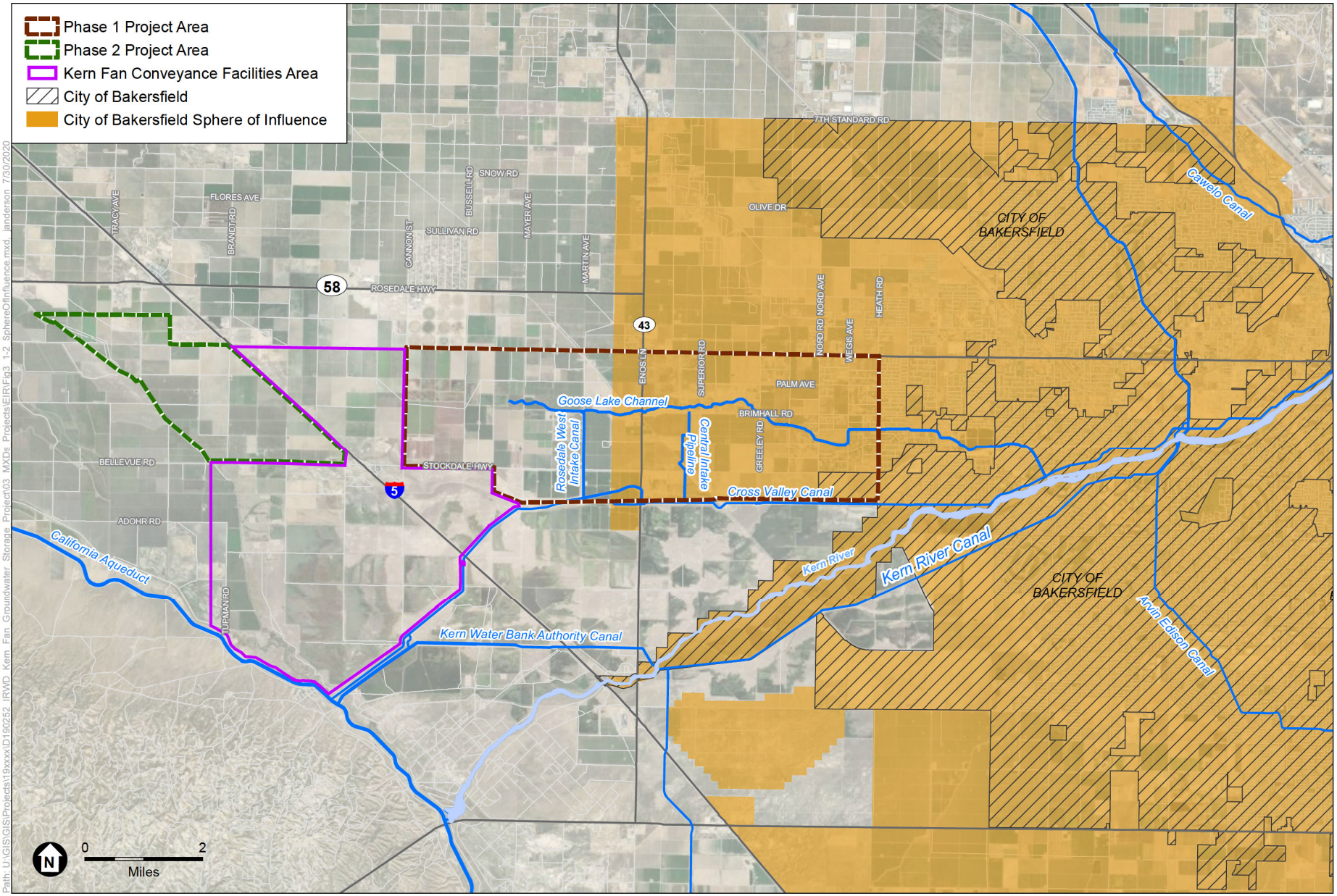
> **Policy 1:** Promote the establishment, maintenance, and protection of the planning area's open space resources, including the following:
>
> (a) Conservation of natural resources
>
> - Kern River Corridor
> - Management of hillsides
>
> (b) Managed production of resources
>
> - Agriculture
> - Oil production
>
> (c) Outdoor Recreation
>
> - Parks
> - Kern River Corridor
>
> **Policy 7:** Consider the use of groundwater recharge lands for recreation, habitat, and alternate resource uses.

Metropolitan Bakersfield Draft General Plan Update: Existing Conditions, Constraints, and Opportunities Report

In April 2009, the City of Bakersfield published an Existing Conditions, Constraints, and Opportunities Report to highlight issues, challenges, and recommended changes to the existing General Plan. Related to the proposed project, the report recommends definition of "scenic resources" and the identification of existing or potential scenic resources in the Metropolitan Bakersfield area on a map. In addition, the report suggests preservation of groundwater banking and recharge areas to reduce overdraft, including providing buffer areas around water banks (City of Bakersfield 2009).

Metropolitan Bakersfield General Plan Update EIR

The Metropolitan Bakersfield General Plan Update EIR discusses specific issues related to aesthetics and visual quality for areas within the Metropolitan Bakersfield area or its Sphere of Influence. The General Plan EIR also contains a specific section that discusses the existing scenic resources located in the area. None of the specific scenic resources are located in the vicinity of the project area. The General Plan EIR mentions that generally the Kern River Corridor is a scenic resource within the Metropolitan Bakersfield area (City of Bakersfield 2002).



SOURCE: ESRI; Kern County; City of Bakersfield, 2020.

Kern Fan Groundwater Storage Project

Figure 3.1-2

City of Bakersfield and Sphere of Influence

ESA

3.1.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to aesthetic resources. The proposed project would have a significant impact if it would:

1. Have a substantial adverse effect on a scenic vista.
2. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State Scenic Highway.
3. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?
4. Create a new source of substantial light or glare which would adversely affect sensitive day or nighttime views in the area.
5. Result in cumulatively considerable impacts to aesthetics.

Methodology

The determination of impacts to aesthetic resources is based on several evaluation criteria, including the extent of project visibility from sensitive viewing areas such as designated State routes and public open space or vantage points; the degree to which the various project elements would contrast with or be integrated into the existing landscape; the extent of change in the landscape's composition and character; and the number and sensitivity of viewers.

This assessment of visual impacts is based on field observations of the project area and surroundings, in addition to a review of topographic maps, aerial photography, and ground-level photographs of the project area.

Impact Analysis

Scenic Vistas

Impact 3.1-1: The proposed project would not have a substantial adverse effect on a scenic vista. (*No Impact*)

The project area is not considered a scenic vista and would not be located within a designated scenic vista or scenic highway corridor. However, the project does provide views of the distant Elk Hills, which can be seen on clear days. The proposed project facilities would not have the scale or massing to obstruct expansive views of the Elk Hills. Additionally, most views of the hills would be from motorists traveling west and south along local roadways, therefore, their views would be brief and would only be obstructed when immediately adjacent to a proposed facility that may be adjacent to a roadway and aboveground. Less than significant impacts to scenic vistas would occur as a result of the proposed project, and no mitigation measures are required.

Mitigation Measures

None Required

Significance Determination

No Impact

Scenic Highway

Impact 3.1-2: The proposed project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State Scenic Highway. (*No Impact*)

Scenic corridors consist of lands that are visible from the right of way of a State Scenic Highway and are comprised primarily of scenic and natural features. Topography, vegetation, viewing distance, and/or jurisdictional lines determine the corridor boundaries. There are no designated scenic highways in the project vicinity; therefore, the proposed project would not affect any scenic resources within a scenic highway corridor. There would be no impact.

Mitigation Measures

None Required

Significance Determination

No Impact

Visual Character and Quality

Impact 3.1-3: The proposed project would not substantially degrade the existing visual character or quality of public views of the project area and its surroundings. (*Less than Significant Impact*)

The proposed project would occur in an area dominated by agricultural land uses. In addition, Rosedale has implemented groundwater recharge and recovery facilities, similar to the proposed project, within the project area, including recharge basins, recovery wells, canals, pump stations, and turnouts, as shown in Figure 2-1. In addition, similar facilities have been developed on neighboring properties, such as the adjacent Kern Water Bank. In Chapter 2 of this Draft EIR, Figure 2-1 identifies the Phase 1 and 2 areas where up to 12 recovery wells and 1,300 acres of recharge basin facilities would be implemented. The Kern Fan Conveyance Facilities would consist of canals and/or pipelines, pump stations and a new turnout at the Aqueduct within and surrounding those Phase 1 and 2 project areas.

Construction Activities

Construction activities associated with all of the proposed facilities would result in short-term impacts to the visual character and quality of the project area. Construction activities would

require the use of construction equipment and storage of materials within the project area for project components. Excavated areas, stockpiled soils and other materials generated during construction could present negative aesthetic elements to the existing visual landscape. However, these effects would be temporary and would not permanently affect the existing visual character and quality of the surrounding area. Further, the presence of construction equipment would not be substantially different from large pieces of agricultural equipment present in the project area and on surrounding lands. All impacts from construction-related activities would be less than significant, and no mitigation measures would be required.

Recharge Facilities

The project area currently includes recharge basins and earthen berms consisting of varying shape, size, and depth. The proposed recharge basins would be constructed on the Kern Fan Project Properties and would be excavated and contoured to a maximum depth of 6 feet. Excavated soils would be used to create vegetated berms around the recharge basins to a maximum height of 3 to 6 feet above the existing ground surface. Recharge basins are open areas of undeveloped land that may or may not hold water (refer to Figure 2-2 for a representative example of a recharge basin). The proposed recharge basins would be similar in size and shape to existing basins within the project area, therefore, their implementation would not appear significantly different than existing conditions. Further, other facilities associated with the basins such as transfer structures, pipe culverts, and supply channels would not have the scale or massing to significantly stand out amongst the agricultural expanse of the project area. Additionally, most public views of the proposed recharge facilities would be from motorists traveling along local roadways, therefore, the recharge facilities would only be seen for a brief time when passing by the specific project site. Implementation of the proposed recharge facilities would alter the visual quality by introducing a 3- to 6-foot earthen berm around the facilities. However, the berm would be vegetated, and therefore, the proposed recharge facilities would appear similar to existing facilities nearby and agricultural land. In most cases, the proposed recharge basins would only be visible for short periods of time, therefore, the proposed recharge facilities would not degrade the visual character or quality of the project area. Impacts would be less than significant, and no mitigation measures are required.

Recovery Facilities

Similar to recharge facilities, the project area currently includes recovery facilities. The proposed wells would also be constructed on the Kern Fan Project Properties. The wells themselves would be 18 to 24 inches in diameter, steel-cased, and underground, therefore not visible to public viewers. Wellheads would consist of above ground facilities such as riser pipes, discharge pipes, wellhead motors, pumps, and other appurtenances. Wellheads would be protected by lockable, roofed, metal-mesh pump houses that are up to approximately 12 feet in height and constructed on square concrete pads (refer to Figure 2-3 for a representative example of a well facility). Similar to recharge facilities, the proposed wells would be similar in appearance to existing wells within the project area, therefore, their implementation would not appear significantly different than existing conditions. As mentioned previously, most public views of the proposed recovery facilities would be from motorists traveling along local roadways, therefore, the recovery facilities would only be seen for a brief time when passing by the specific project site. The

proposed recovery facilities would appear similar to existing facilities and in most cases would only be visible for short periods of time, therefore, the proposed recovery facilities would not alter the overall visual character or quality of the site. Impacts would be less than significant. No mitigation measures are required.

Conveyance Facilities

The proposed Kern Fan Conveyance Facilities include a new turnout, additional canals and/or pipelines, and up to three pump stations. The proposed turnout at the Aqueduct and the new conveyance system would be approximately 10 miles long and may include an open canal, closed conduit or some combination thereof.

Pipelines associated with the Kern Fan Conveyance Facilities would be located underground under dirt roads, between recharge basins, or buried in basin bottoms; therefore, once constructed, pipelines would have no impact to the existing visual character or quality of the project area.

Canals associated with the Kern Fan Conveyance Facilities would be either at ground level or up to 12 feet in height, depending on the canal alignment and topography. The proposed canals would be concrete, shotcrete, high-density polyethylene (HDPE) or earthen-lined. Proposed canals would appear similar to other canals in the area such as the Cross Valley Canal (CVC) (refer to Figure 2-1 and Figure 2-2), and therefore, would not alter the character or degrade the visual quality of the area.

The proposed pump stations would be approximately 12 feet in height, with typical facilities shown in Figure 2-4. The new pump stations would be designed similar to other water infrastructure development such as other pumps and wells within the immediate area. Therefore, introduction of up to three pump stations would not significantly contrast with the existing visual character of the area.

The proposed Aqueduct turnout would be located at the California Aqueduct, which is not visible from most roadways. The facility would be similar to the typical turnout facilities shown in Figure 2-4 and would not appear different than the existing California Aqueduct facilities, and therefore would not contrast with the existing visual character of the Aqueduct.

Similar to the proposed recharge and recovery facilities, other Kern Fan Conveyance Facilities would appear similar to existing water infrastructure in the area. Public views would be brief and intermittent, depending on how many motorists are on the local roadways. Therefore, the proposed Kern Fan Conveyance Facilities would not significantly affect the visual character or quality of the project area. Less than significant impacts would occur, and no mitigation measures are required.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Light and Glare

Impact 3.1-4: The proposed project could create a new source of substantial light or glare which would adversely affect sensitive day or nighttime views in the area. (*Less than Significant Impact with Mitigatio*n)

Construction of the proposed recharge facilities, most recovery facilities and conveyance facilities would not require lighting for day-time construction activities, therefore construction activities would not introduce new sources of substantial light or glare in the project area. As a result, construction associated with all proposed facilities other than wells would be less than significant, and no mitigation measures would be required.

The proposed wells would require temporary nighttime construction, in particular 24-hour drilling. Such nighttime construction would require security lighting in addition to construction lighting The project areas are predominately surrounded by agricultural fields with sparse residential uses. Therefore, nighttime and security lighting could appear bright and adversely affect sensitive nighttime views in the area. Impacts would be potentially significant.

However, in accordance with **Mitigation Measure AES-1**, all nighttime lighting would be shielded and directed downwards onto the construction work area, avoiding spillover into surrounding properties. Construction lighting would be temporary and short-term and would not create a new permanent source of nighttime light or glare. Security lighting may be installed on new facilities; however, such lighting would be attached to motion sensors and, in accordance with Mitigation Measures AES-1, would be directed downward to focus lighting to the immediate surroundings and avoid light spillover onto surrounding areas.

As a result, the proposed project would minimize new nighttime light sources and would protect the ability to view the night sky by restricting unnecessary upward projection of light, in support of the Kern County Dark Skies Ordinance. Impacts related to light would be less than significant with mitigation.

When recharge basins' water levels are at their peak in the winter and spring months, basins could create new sources of glare from an increased water surface area. However, the proposed recharge basins would be surrounded by vegetated berms of 4 to 5 feet in height. The earthen berms would block any potential glare from the recharge basins. Further, the recharge basins would only noticeable to motorists travelling along local roadways for brief periods of time (several seconds). As a result, impacts to daytime glare would be less than significant.

Mitigation Measures

> **AES-1**: All nighttime construction lighting and security lighting installed on new facilities shall be shielded and directed downward to avoid light spill onto neighboring properties and visibility from surrounding vantage points.

Significance Determination

Less than Significant Impact with Mitigation

Cumulative Impacts

Impact 3.1-5: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to aesthetics. (*Less than Significant Impact with Mitigation*)

This section presents an analysis of the cumulative effects of the proposed project in combination with other present and reasonably foreseeable future projects that could generate cumulatively considerable impacts to aesthetics. The cumulative projects considered in this analysis are listed in Table 3-2 of Chapter 3 of this Draft EIR. The geographical extent of cumulative impacts related to aesthetics includes viewsheds in the San Joaquin Valley in which the project is visible.

Construction and Operation

Significant cumulative impacts related to aesthetics could occur if the project, in conjunction with cumulative projects, could block significant scenic vistas, create cumulative light and glare, or substantially degrade the visual quality of an area. The cumulative projects are projects that either involve road improvements and extensions, and one recharge, conveyance and recovery project within the Rosedale service area. There are no scenic vistas within the general vicinity of the proposed project, therefore cumulative projects would not combine with the proposed project to impact scenic vistas within the area. Further, there are no State Scenic Highways in the general vicinity of the area, therefore no cumulative impacts would occur in regards to degrading aesthetic resources within view corridors of State Scenic Highways.

While the cumulative projects would involve construction equipment similar to the proposed project, the machinery would only be visible for short periods of time and construction work is temporary in nature. Therefore, construction of cumulative projects in conjunction with the proposed project would not result in significant cumulative impacts to the visual character of the area during construction. Some cumulative projects would implement road improvements and extensions on existing streets and highways, therefore, implementation of these cumulative projects would not result in significant impacts to the visual character of the area once constructed. Various cumulative projects, such as Cumulative Project 6 would introduce new built facilities into the project area that are similar to the proposed project. The proposed facilities would include water recharge, recovery and conveyance facilities. Similar to discussed above, the project area's existing environment consists of similar water facilities spread out amongst agricultural and rural residential areas. Because these cumulative projects would implement similar facilities that are within the existing environment of the project area, the project would not substantially alter or degrade the visual character and quality of the general vicinity of the proposed project. Cumulative projects, in conjunction with the proposed project would result in less than significant cumulative impacts to visual character and quality.

Cumulative projects that include road improvements would occur within existing roadways, and therefore would not implement new structures that would introduce new light or glare into the area. However, similar to the proposed project, other cumulative projects such as Cumulative Project 12 would include wells, which would require overnight drilling and nighttime lighting

during construction. Further, new built water facilities proposed as part of the cumulative projects may contain security lighting. Implementation of cumulative projects could result in significant impacts regarding light and glare. However, the proposed project would include implementation of Mitigation Measure AES-1, which would direct and shield lighting away/from neighboring properties. Therefore, the proposed project's contribution to cumulative light and glare impacts would result in less than cumulatively considerable impacts regarding light and glare. The project would not combine together with the projects in the cumulative scenario to be cumulatively considerable, and impacts would be less than significant with mitigation.

Mitigation Measures

Implement Mitigation Measure AES-1.

Significance Determination

Less than Significant Impact with Mitigation

3.1.4 References

Caltrans, 2020. ArcGIS, California Scenic Highways. Available online at: https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=f0259b1ad0fe4093a5604c9b838a486a¸accessed July 2020.

City of Bakersfield, 2002. Metropolitan Bakersfield, General Plan Update EIR, Aesthetics. Available online at: http://docs.bakersfieldcity.us/weblink/0/edoc/955916/Sec04-02.Aesthetics.pdf, accessed July 2020.

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County of Kern, 2011. Dark Skies Ordinance. Available online at: https://psbweb.co.kern.ca.us/planning/pdfs/FORM%20728%20-%20Dark%20Skies%20Ordinance.pdf, accessed July 2020.

Federal Highway Administration, 2020. America's Byways: California. Available online at: https://www.fhwa.dot.gov/byways/states/CA, accessed July 2020.

3.2 Agriculture and Forestry Resources

This section addresses the potential impacts to agriculture and forestry resources associated with construction and operation of the proposed project. This section describes the environmental setting for agricultural and forestry resources in the project area, summarizes the applicable regulatory framework, and identifies impacts to agricultural resources that could occur as a result of implementation of the proposed project, including cumulative impacts.

3.2.1 Environmental Setting

Regional

The proposed project is located in the southern San Joaquin Valley in Kern County near the cities of Bakersfield, Wasco, McFarland, and Shafter. The San Joaquin Valley, along with the Sacramento Valley to the north, makes up the greater California Central Valley, which is a large, flat valley that dominates the central portion of the state. The San Joaquin Valley is bounded by the Sierra Nevada to the east, the Tehachapi Mountains to the south, the Coast Range to the west, and the Sacramento Valley to the north.

California is the nation's top agricultural producer, and Kern County is the second most productive county in the state after Fresno County (CDFA 2019). Kern County leads the state in grape, almonds, pistachios, and milk production and other notable agricultural commodities such as citrus and alfalfa hay (CDFA 2019). Other important agricultural commodities for Kern County include carrots, potatoes, cattle, tomatoes, apiary, pomegranates, garlic, cotton, bell peppers, and onion (Kern County 2019).

The Department of Conservation (DOC) Farmland Mapping and Monitoring Program (FMMP) identifies lands that have agricultural value and maintains a statewide map of agricultural lands in its Important Farmlands Inventory (IFI) System (DOC 2004). The IFI classifies land based upon its productive capabilities, which is based on many characteristics, including fertility, slope, texture, drainage, depth, salt content, and availability of water for irrigation. The DOC maintains the FMMP and monitors the conversion of farmland to and from agricultural use through its Important Farmland Inventory System. Farmlands are divided into the categories described below based on their suitability for agriculture (DOC 2004).

> **Prime Farmland.** Farmland that 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.** Farmland 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. Farmland of lesser-quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been used for crops at some time during the 4 years prior to the mapping date.

Farmland of Local Importance. Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. This designation includes soils that are listed as Prime Farmland or Farmland of Statewide Importance that are not irrigated and soils growing dryland crops such as beans, grains, dryland walnuts, or dryland apricots.

Grazing Land. 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. The minimum mapping unit for Grazing Land is 40 acres.

Urban and Built-up Land. Land occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel. This land is used for residential, industrial, commercial, institutional, public administrative purposes, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.

Other Land. Land not included in any other mapping category. Common examples include low-density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines and 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.

According to the DOC FMMP's 2016-2018 Kern County Land Use Conversion Table, in 2018, Kern County had 2,728,667 acres of total agricultural land, of which 874,026 acres were classified with an Important Farmland category and 1,854,641 acres were classified as Grazing Land (DOC 2018, Table A-11). From 2016 to 2018, Kern County experienced a net loss of approximately 6,076 acres of Important Farmland and a net gain of approximately 5,378 acres of Grazing Land, resulting in a net loss of 702 acres of agricultural lands (DOC 2018). When considering the conversion of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland during the period of 2016 to 2018, approximately 87 percent of such lands were converted to Grazing Lands, and approximately 6 percent were converted to Urban Lands. From 2016 to 2018, approximately 6,780 acres were urbanized in Kern County, with 795 acres switching from Important Farmland to Urban Land and 1,278 acres switching from Grazing Land to Urban Land (DOC 2018).

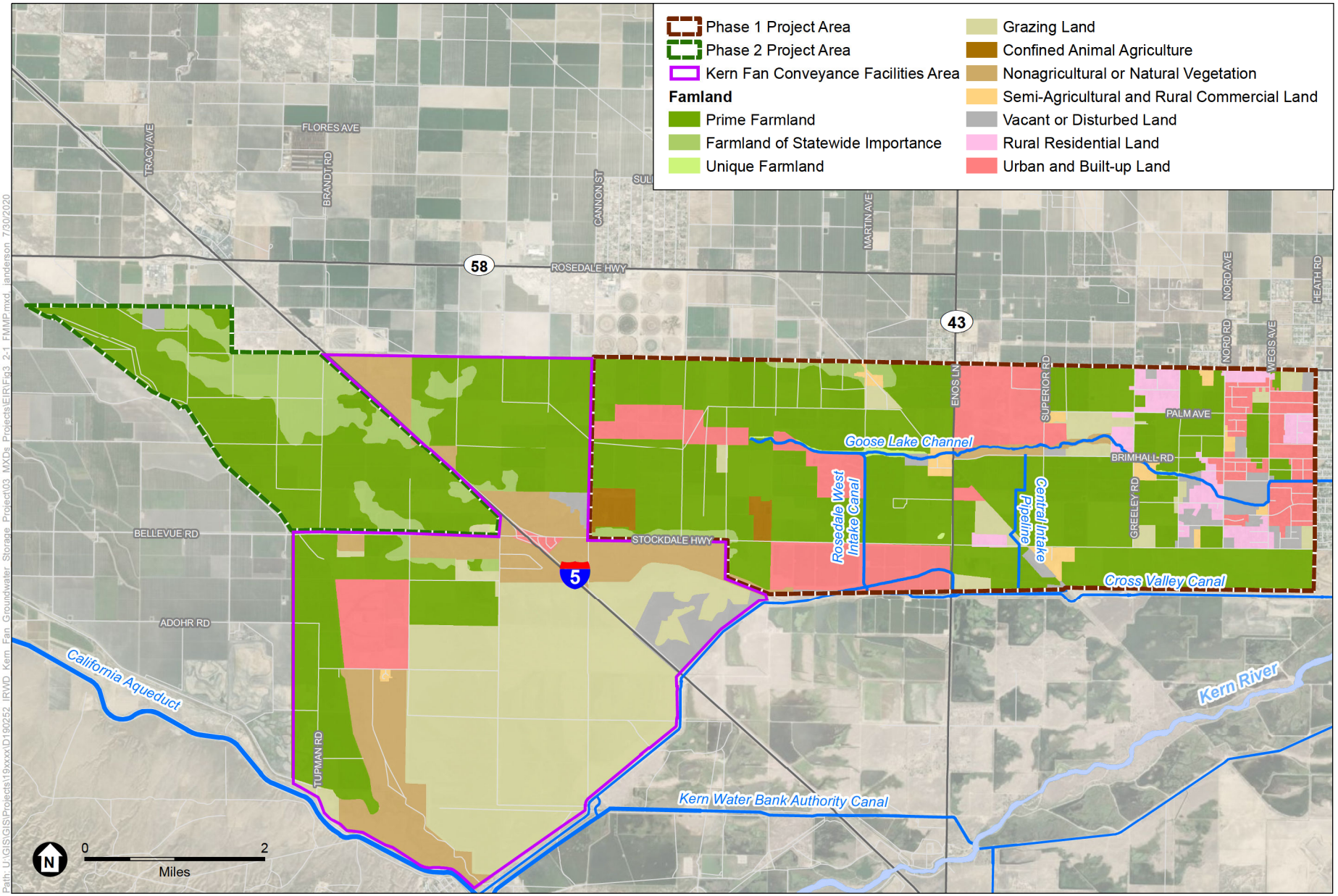
Local

The project area consists of the Phase 1 and Phase 2 areas that are within Rosedale's service area, as well the Kern Fan Conveyance Facilities area that is primarily adjacent to Rosedale's service area, as seen in Figure 2-1. The proposed project is located largely within unincorporated Kern County with the eastern most portion of the project lying within the City of Bakersfield limit. The majority of the project area is zoned as Exclusive Agriculture though there are some residential, commercial and industrially zoned sites in the Phase 1 area, and some Limited Agriculture and Commercial Highway zoned areas in the Phase 2 and Kern Fan Conveyance Facility project areas. For further discussion of zoning see Section 3.11, *Land Use and Planning.*

While there is no forested land in the project area there are extensive amounts of agricultural land at the project area. The project area overall is widely used for agriculture. Crops currently grown in the project area are diverse. As shown in **Figure 3.2-2**, more prevalent crops in the project area include alfalfa, almonds, beans, cotton, potatoes, and pistachios. Most crops are grown in Phase 1 and 2 project areas. The eastern portion of Phase 1 and large portions of the Kern Fan Conveyance Facilities areas do not currently produce crops. The eastern portion of the Phase 1 area includes portions of the City of Bakersfield while large portions of the Kern Fan Conveyance Facilities area are designated as Grazing Land as discussed further below, and are part of the Kern Water Bank.

The state FMMP maps and ranks important Farmland in California. As show in **Figure 3.2-1** the majority of the Phase 1 area is Prime Farmland. Other FMMP designations in the Phase 1 area include primarily Urban and Built Up Land as well as smaller areas of Rural Residential Land and a few parcels of land designated as Farmland of Statewide Importance or Unique Farmland. The Phase 2 area is almost entirely comprised of either Prime Farmland or Farmland of Statewide Importance with only a few parcels either designated as Grazing Land or Vacant or Disturbed Land. The Kern Fan Conveyance Facilities area consists of primarily of Prime Farmland in the north and west and Grazing Land in the south and east with Unique Farmland, Built Up Land, Nonagricultural or Natural Vegetation, and Vacant or Disturbed Land interspersed throughout.

Kern County uses an Agricultural Preserve Program to designate all land in the agricultural spectrum within the county. The Agricultural Preserve Program intends to preserve agriculture land necessary to the State's economic vitality, and is enforced through provisions in the Williamson Act (described further below in Section 3.2.2, *Regulatory Setting*). The proposed project traverses Agricultural Preserves 3, 9, 10, and 11 (Kern County 2006). There are lands within the project area under Williamson Act contract as shown in **Figure 3.2-3**.



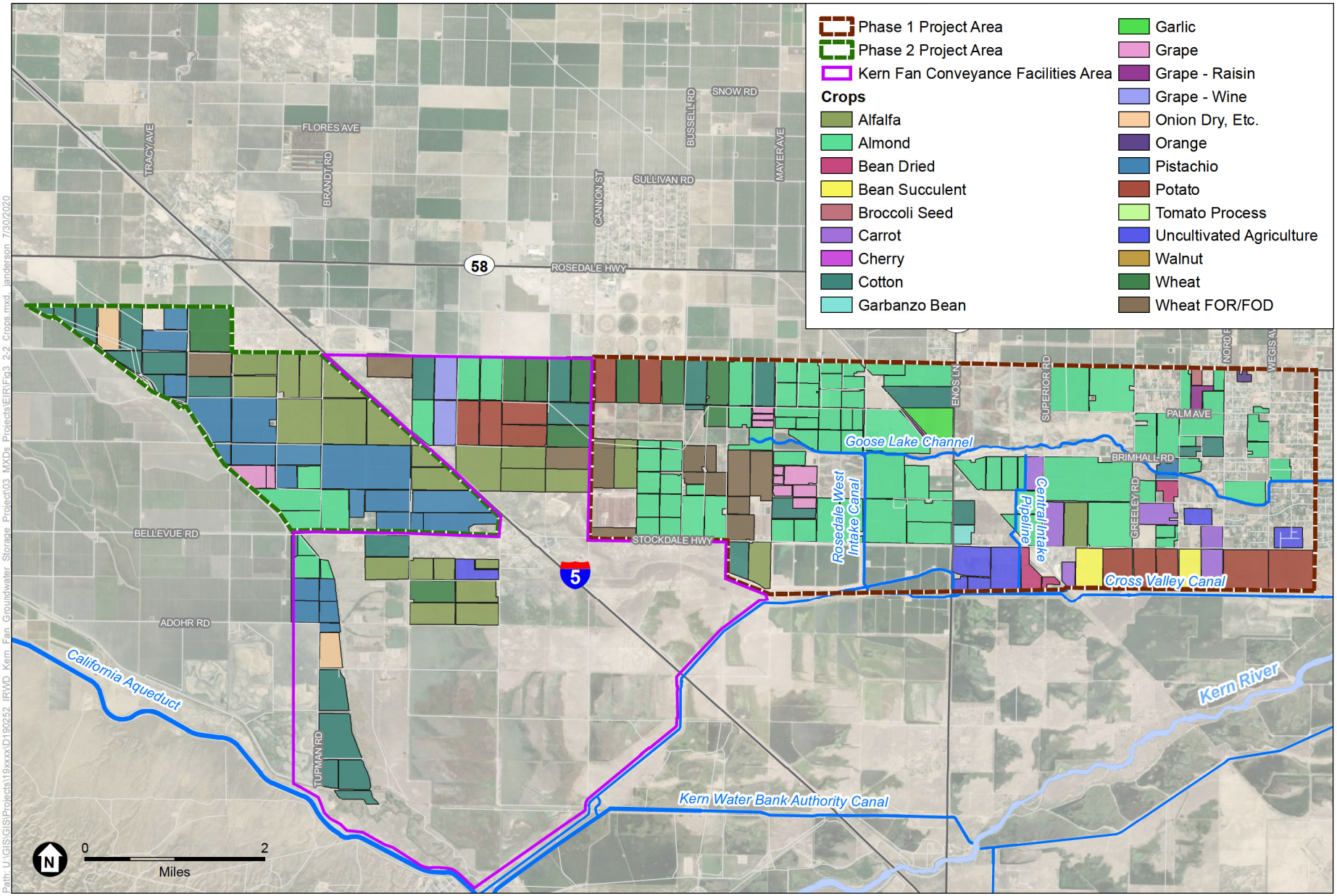
SOURCE: ESRI; Kern County; FMMP, 2016

Kern Fan Groundwater Storage Project

Figure 3.2-1

Designated Farmland in the Project Vicinity

ESA



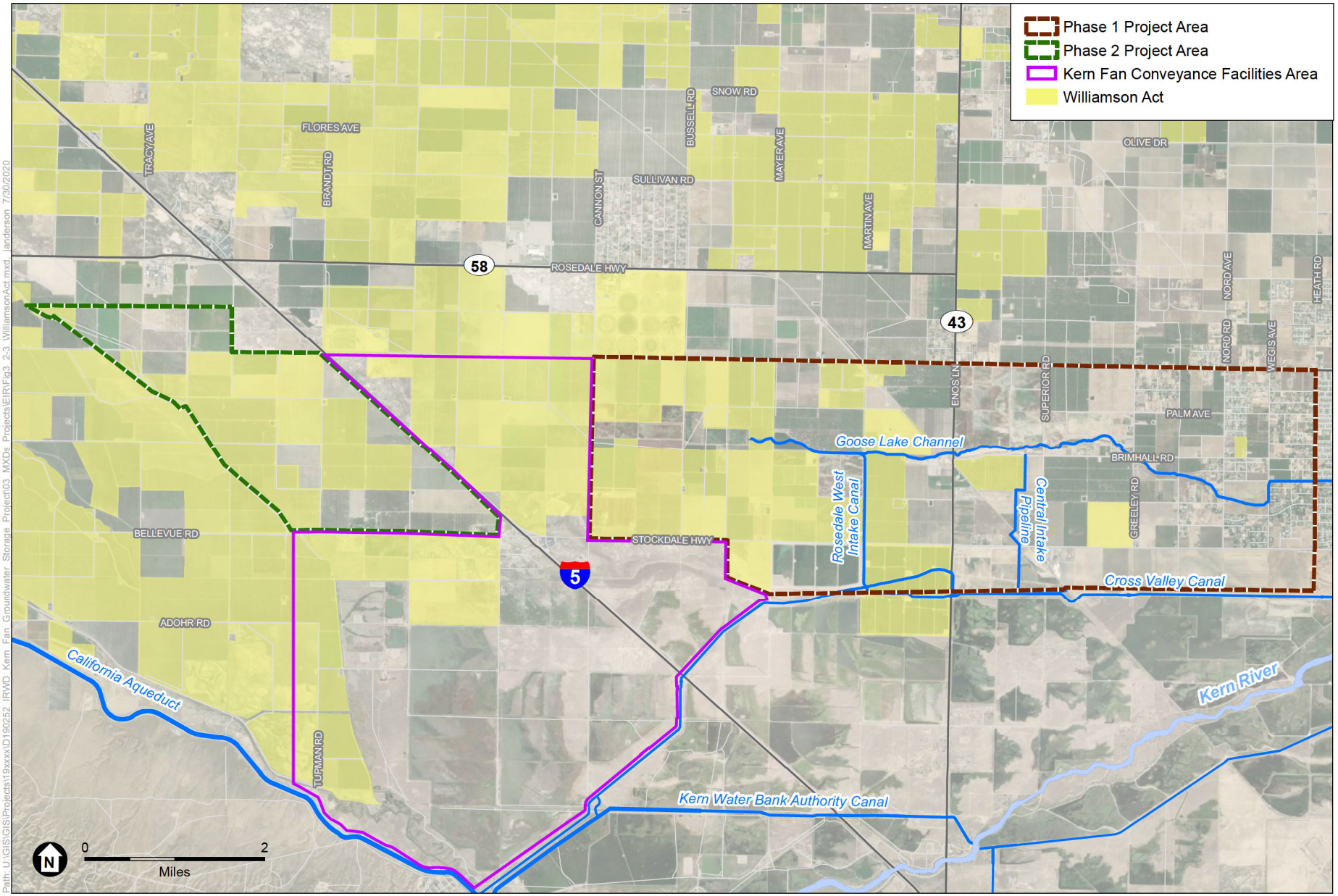
SOURCE: ESRI; Kern County, 2017.

Kern Fan Groundwater Storage Project

Figure 3.2-2

Agricultural Uses within the Project Area

ESA



SOURCE: ESRI; Kern County

Kern Fan Groundwater Storage Project

Figure 3.2-3

Williamson Act Contracts

ESA

3.2.2 Regulatory Setting

Federal

Farmland Protection Policy Act (7 U.S.C. Section 4201)

The purpose of the Farmland Protection Policy Act (FPPA) is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. It additionally directs federal programs to be compatible with state and local policies for the protection of farmlands. Congress passed the *Agriculture and Food Act of 1981* (Public Law 97-98) containing the FPPA—Subtitle I of Title XV, Sections 1539–1549. The final rules and regulations were published in the Federal Register on June 17, 1994.

Federal agencies are required to develop and review their policies and procedures to implement the FPPA every 2 years. The FPPA does not authorize the federal government to regulate the use of private or nonfederal land or, in any way, affect the property rights of land owners.

For the purpose of the FPPA, Farmland includes Prime Farmland, Unique Farmland, and Land of Statewide or Local Importance. Farmland subject to FPPA requirements does not have to be currently used for cropland, it can be Forest Land, Pastureland, Cropland, or other land, but not Urban and Built-up Land.

Projects are subject to FPPA requirements if they may irreversibly convert Farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency (NRCS 2020).

State

California Department of Conservation, Division of Land Resource Protection

The DOC applies the soil classifications created by the Natural Resources Conservation Service (NRCS) to identify and plan for California's agricultural land resources. The State employs a variety of classification systems to determine the suitability of soils for agricultural use. The two most widely used systems are the Capability Classification System and the California Revised Storie Index. The Capability Classification System classifies soils from Class I to Class VIII based on their ability to support agriculture with Class I being the highest quality soil. The California Revised Storie Index is used mainly for irrigated agriculture and is based on crop productivity data. For the California Revised Storie Index, Grade 1 soils are considered "excellent," and Grade 2 soils are considered "good" (O'Geen et al. 2008).

As described previously in Section 3.2.1, *Environmental Setting* the DOC maintains the FMMP and monitors the conversion of Farmland to and from agricultural use through its Important Farmland Inventory System. The DOC has a minimum mapping unit of 10 acres, with parcels that are smaller than 10 acres being absorbed into the surrounding classifications. Farmlands are divided into categories such as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland (DOC 2004).

Williamson Act

The California Land Conservation Act of 1965, also known as the Williamson Act, is designed to preserve agricultural and open space lands by discouraging their premature and unnecessary conversion to urban uses. Williamson Act contracts, also known as agricultural preserves, create an arrangement whereby private landowners contract with counties and cities to voluntarily restrict their land to agricultural and compatible open-space uses. The vehicle for these agreements is a rolling term 10-year contract (DOC 2020). In return, restricted parcels are assessed for tax purposes at a rate consistent with their actual use, rather than potential market value. To cancel a Williamson Act contract, either the local government or the landowner can initiate the nonrenewal process. A "notice of nonrenewal" starts a 9-year nonrenewal period. During the nonrenewal process, the annual tax assessment gradually increases. At the end of the 9-year nonrenewal period, the contract is terminated. Contracts renew automatically every year unless the nonrenewal process is initiated. Williamson Act contracts can be divided into the following categories: Prime Agricultural Land, Non-Prime Agricultural Land, Open Space Easement, Built Up Land, and Agricultural Land in Non-Renewal.

The Williamson Act states that a board or council by resolution shall adopt rules governing the administration of agricultural preserves. The rules of each agricultural preserve specify the uses allowed. Generally, any commercial agricultural use will be permitted within any agricultural preserve. In addition, local governments may identify compatible uses permitted with a use permit. As described below, the Kern County Planning and Natural Resources Department has adopted its own rules governing agricultural preserves and compatible uses.

Farmland Security Zone Act

The Farmland Security Zone Act is similar to the Williamson Act and was passed by the California State Legislature in 1999 to ensure that long-term farmland preservation is part of public policy. Farmland Security Zone Act contracts are sometimes referred to as “Super Williamson Act Contracts.” Under the provisions of this act, a landowner already under a Williamson Act contract can apply for Farmland Security Zone status by entering into a contract with the county. Farmland Security Zone classification automatically renews each year for an additional 20 years. In return for a further 35 percent reduction in the taxable value of land and growing improvements (in addition to Williamson Act tax benefits), the owner of the property promises not to develop the property into nonagricultural uses. Kern County has an 80-gross acre size requirement for parcels to be included in the Farmland Security Zone Program.

Public Resources Code Section 21060.1

Public Resources Code (PRC) Section 21060.1 defines “Agricultural land” for the purposes of assessing environmental impacts using the Farmland Mapping and Monitoring Program (FMMP). The FMMP was established in 1982 to assess the location, quality, and quantity of agricultural lands and the conversion of these lands. The FMMP provides guidance for the analysis of agricultural and land use changes throughout California.

Public Resources Code Section 12220(g)

PRC Section 12220(g) defines “Forest land” as land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of

one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

Public Resources Code 4526

PRC Section 4526 defines "Timberland" as land, other than land owned by the federal government and land designated by the board as experimental forest land, which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees. Commercial species shall be determined by the board on a district basis.

Government Code Section 51104(g)

The *California Code, Government Code* Section 51104(g) provides a definition for "Timberland production zones" or "TPZ" as an area which has been zoned pursuant to Section 51112 or 51113 and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses, as defined in subdivision (h).

Land Evaluation and Site Assessment Model (LESA)

The Land Evaluation and Site Assessment (LESA) is a point-based approach for rating the relative importance of agricultural land resources based upon specific measurable features for project proposals that would result in a conversion of agricultural land to non-agricultural uses. The California LESA Model was developed to provide lead agencies with an optional methodology to ensure that potential significant effects on the environment of agricultural land conversions are quantitatively and consistently considered in the environmental review process (*PRC* Section 21095), including in CEQA reviews.

The California Agricultural LESA Model evaluates measures of soil resource quality, a given project's size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands. For a given project, the factors are rated, weighted, and combined, resulting in a single numeric score. The project score becomes the basis for making a determination of a project's potential significance. The LESA Model is not used in the analysis of, or impact determination for, the proposed project because the specific locations for the recharge and recovery facilities, and alignment and locations for the Kern Fan Conveyance Facilities, have not been selected.

Sustainable Groundwater Management Act of 2014

The Sustainable Groundwater Management Act of 2014 (SGMA), effective January 1, 2015, authorizes local agencies to manage groundwater in a sustainable manner and allows limited state intervention when necessary to protect groundwater resources. The SGMA requires the creation of a Groundwater Sustainability Agency (GSA) that would develop and implement a Groundwater Sustainability Plan to manage and use groundwater in a manner that can be maintained during the planning and implementation horizon without undesirable results, defined as follows:

(1) Chronic lowering of groundwater levels, indicating a significant and unreasonable depletion of supply;

(2) Significant and unreasonable reduction of groundwater storage;

(3) Significant and unreasonable seawater intrusion;

(4) Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies;

(5) Significant and unreasonable land subsidence that substantially interferes with surface land uses; or

(6) Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

The project area is located within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin (Basin No. 5-022.14), which is a high-priority basin. The Sub-basin includes 11 organized GSAs. Of these, six GSAs elected to be included in the GSP of the Kern Groundwater Authority, including Rosedale (RRBWSD 2019). The Kern Groundwater Authority, the designated local GSA, submitted its groundwater sustainability plan (GSP) on January 1, 2020 (KGA 2020).

The following basin sustainability goals related to groundwater supply reliability and protection of water quality were developed for the Kern Groundwater Authority GSP:

- Achieve sustainable groundwater management in the Kern County Sub-basin through the implementation of projects and management actions at the member agency level of each GSA.
- Maintain its groundwater use within the sustainable yield of the basin as demonstrated by monitoring and reporting groundwater conditions.
- Operate within the established sustainable management criteria, which are based on the collective technical information presented in the GSPs in the Sub-basin.
- Collectively bring the Sub-basin into sustainability and maintain sustainability over the implementation and planning horizon supplies are managed to optimize water supply reliability and minimize land subsidence.

As noted above, California is the nation's top agricultural producer, and Kern County is the second most productive county in the state after Fresno County (CDFA 2019). Agricultural productivity is reliant on a sustainable water supply for irrigation; therefore, sustainable management of the Kern County Sub-basin is directly tied to sustainable management of agricultural lands, including the provision of water for irrigation for Prime Farmland, Farmland of Statewide Importance, and Unique Farmland.

Local

Kern County Agricultural Preserve Standard Uniform Rules

The Kern County Planning Department has adopted *Agricultural Preserve Standard Uniform Rules*, which identify land uses that are compatible within agricultural preserves established under the Williamson Act (Kern County 2013). The rules are designed to restrict land uses to those compatible with agriculture, including crop cultivation, livestock breeding, grazing operations, and dairies. In addition, some non-agricultural land uses are considered compatible,

including public utilities facilities (e.g., gas, electric, communication, water) and groundwater recharge facilities. Public water utility facilities are considered compatible uses when the following is proposed:

- The erection, construction, alteration, operation, and maintenance of gas, electric, water, and communication utility facilities and similar public service facilities by corporations and companies under the jurisdiction of the Public Utilities Commission of the State of California and by public agencies.

Water recharge facilities are considered compatible uses when either:

- The affected land will continue to be used for commercial agricultural purposes for a minimum of seven (7) months out of each twelve (12) month period; or,

- The Land Use Contract is amended by the Board of Supervisors to allow water recharge as the primary purpose of an "open space" contract, Public Resources Code. (included by Kern County Board of Supervisors Resolution 2007-017)

Kern County General Plan

The *Kern County General Plan* (County General Plan) states that agriculture is vital to the future of Kern County and sets the goals, policies, and procedures of protecting important agricultural lands for future use and to prevent conversion of prime farmland to other uses (Kern County 2009). Currently the project area is designated primarily as Intensive Agriculture (Map Code 8.1) by the County General Plan though there are commercial, residential, and industrial sites within the Phase 1 project, and parcels of Limited Agriculture and Commercial Highway in the Phase 2 and Kern Fan Conveyance Facility project area (Kern County Planning Department 2009). According to the County General Plan, permitted uses under this designation include water storage and groundwater recharge acres and facilities (Kern County Planning Department 2009). Therefore, the proposed project is compatible with the County General Plan. Within the *Land Use, Open Space, and Conservation Element* Resource Section of the County General Plan, there are goals, policies, and implementation measures that are applicable to the proposed project regarding agricultural resources:

> **Goal 1:** To contain new development within an area large enough to meet generous projections of foreseeable need, but in locations which will not impair the economic strength derived from the petroleum, agriculture, rangeland, or mineral resources, or diminish the other amenities which exist in the County.
>
> **Goal 2:** Protect areas of important mineral, petroleum, and agricultural resource potential for future use.
>
> **Goal 5:** Conserve prime agriculture lands from premature conversion.
>
> > **Policy 7:** Areas designated for agricultural use, which include Class I and II and other enhanced agricultural soils with surface delivery water systems, should be protected from incompatible residential, commercial, and industrial subdivision and development activities.
> >
> > **Policy 10:** To encourage effective groundwater resource management for the long-term economic benefit of the County the following shall be considered:

- Promote groundwater recharge activities in various zone districts.
- Support the development of future sources of additional surface water and groundwater, including conjunctive use, recycled water, conservation, additional storage of surface water and groundwater and desalination.

Implementation Measure F: Prime agricultural lands, according to the Kern County Interim-Important Farmland map produced by the Department of Conservation, which have Class I or II soils and a surface delivery water system shall be conserved through the use of agricultural zoning with minimum parcel size provisions.

Metropolitan Bakersfield General Plan

The south eastern most portion of the Phase 1 project area is located within the area governed by the *Metropolitan Bakersfield General Plan* (Bakersfield General Plan) (City of Bakersfield and Kern County 2007). Within the Conservation Element, *Soils and Agriculture* Section of the Bakersfield General Plan, there is a goal, policies, and an implementation measure that are applicable to the proposed project regarding agricultural resources:

Goal 1: Provide for the planned management, conservation, and wise utilization of agricultural land in the planning area.

Policy 3: Protect areas designated for agricultural use, which include Class I and II agricultural soils having surface delivery water systems, from the encroachment of residential and commercial subdivision development activities.

Policy 14: When considering proposals to convert designated agricultural lands to non-agricultural use, the decision making body of the City and County shall evaluate the following factors to determine the appropriateness of the proposal:

- Soil Quality;
- Availability of irrigation water;
- Proximity to non-agricultural uses;
- Proximity of intensive parcelization;
- Effect on properties subject to "Williamson Act" land use contracts;
- Ability to be provided with urban services (sewer, water, roads, etc.);
- Ability to affect the application of agricultural chemicals on nearby agricultural properties;
- Ability to create a precedent-setting situation that leads to the premature conversion of prime agricultural lands;
- Demonstrated project need; and
- Necessity of buffers as lower densities, setbacks, etc.

Implementation Measure 2: Evaluate discretionary projects for their impact on agricultural resources.

Kern County Zoning Ordinance

The Kern County Zoning Ordinance provides the zoning districts for the parcels within the unincorporated areas of the County. The zoning designations for the project area are: A (Exclusive Agriculture); A-1 (Limited Agriculture); C-2 (General Commercial, Precise Development Combining); CH (Highway Commercial, Precise Development Combining);

E (1) (Estate – 1 Acre, Residential Suburban Combining, Petroleum Extraction Combining); E(2 ½) (Estate 2.5 Acres, Residential Suburban Combining, Floodplain Secondary Combining); M-1 (Light Industrial, Precise Development Combining); M-2 (Medium Industrial, Precise Development Combining). M-3 (Heavy Industrial, Precise Development Combining); OS (Open Space); and R-1 (Low Density Residential). Figure 3.11-2 shows the zoning designations for the project area. An explanation of the purposes and application of each designation is included in Section 3.11, *Land Use and Planning*

3.2.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to agriculture and forestry resources. The proposed project would have a significant impact if it would:

1. 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.
2. Conflict with existing zoning for agricultural use, or a Williamson Act contract.
3. 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)).
4. Result in the loss of forest land or conversion of forest land to non-forest use.
5. 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.
6. Result in cumulatively considerable impacts to agriculture and forestry resources.

Methodology

This environmental analysis related to agriculture is based on the following information: the definition of the proposed project provided in Chapter 2, *Project Description*; a review of applicable documents (reports and maps) and the regulatory requirements summarized above in Section 3.2.2, *Regulatory Setting*; and assessment of existing conditions for agriculture and forestry. The analysis of the potential effects of the proposed project related to agriculture and forestry resources is discussed in the Impact Analysis provided below.

Impact Analysis

Farmland Conversion

Impact 3.2-1: The proposed project could 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 a non-agricultural use. (*Less than Significant Impact with Mitigation*)

As shown in Figure 3.2-1, the majority of the Phase 1 area is Prime Farmland with a few parcels of land designated as Farmland of Statewide Importance or Unique Farmland. The Phase 2 area is almost entirely comprised of either Prime Farmland or Farmland of Statewide Importance. The Kern Fan Conveyance Facilities area consists of primarily of Prime Farmland in the north and west and Grazing Land in the south and east with Unique Farmland interspersed throughout. Therefore, implementation of the proposed project could directly affect Farmland as classified by the DOC's FMMP.

The proposed recharge and recovery facilities in the Phase 1 and Phase 2 areas would not primarily be used for active agricultural production; however, direct agricultural uses would not be precluded in the long-term future and would be implemented onsite in the short-term within the proposed recharge basins. Agricultural land uses, such as annual farming, grazing, or fallowing, would be allowed within the basins at both the Phase 1 and Phase 2 areas when not operated for water recharge or water management purposes. Groundwater recharge facilities are considered to be compatible agricultural land uses according to Kern County's *Agricultural Preserve Standard Uniform Rules*, Kern County's General Plan Land Use designation of Intensive Agriculture, and Kern County's zoning designation for Exclusive Agriculture, as discussed in Section 3.11, *Land Use and Planning*. Grazing activities could be used as well to remove or control vegetative growth. The Authority (or its respective lessees) shall supply any water necessary for irrigated agriculture or other overlying uses. Therefore, implementation of the proposed recharge and recovery facilities in the Phase 1 and Phase 2 areas would not convert Prime Farmland, Unique Farmland or Farmland of Statewide Importance to non-agricultural use. Impacts would be less than significant.

The Kern Fan Conveyance Facilities could be located on lands that are designated as Prime Farmland or Unique Farmland, depending on the path of the alignment from the California Aqueduct to the proposed recharge and recovery facilities in the Phase 1 and Phase 2 areas, as well as the design of the conveyance facilities as either a canal and/or pipeline. Construction and operation of the Kern Fan Conveyance Facilities would require temporary and permanent easements across small portions of various properties along the canal and/or pipeline alignment, including easements across Prime Farmland or Unique Farmland. The easements would not prevent the parcels from continuing to be used for agricultural use. Also, water conveyance facilities are considered to be compatible agricultural land uses according to Kern County's *Agricultural Preserve Standard Uniform Rules*, Kern County's General Plan Land Use designation of Intensive Agriculture, and Kern County's zoning designation for Exclusive Agriculture (see Section 3.11, *Land Use and Planning* for more information). Therefore, implementation of the proposed Kern Fan Conveyance Facilities would not convert Prime Farmland or Unique Farmland to non-agricultural use. Impacts would be less than significant.

In addition, as noted above, Kern County is the second most productive county in the state after Fresno County (CDFA 2019). Agricultural productivity is reliant on a sustainable water supply to support the irrigation of farmland; therefore, sustainable management of the Kern County Sub-basin is directly tied to sustainable management of agricultural lands, including the provision of water for irrigation for Prime Farmland and Unique Farmland. The proposed project is one of more than 150 projects and management actions in the Kern Groundwater Authority GSP (KGA 2020). The projects and management actions are required to be implemented to ensure the Kern County Sub-basin can achieve its sustainability goals, including maintaining groundwater use within the sustainable yield of the basin. As a result, the proposed project would directly support farmland in the project area by conveying and storing water in the Kern County Sub-basin that would later be extracted to provide water for irrigation of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. The proposed project would support the continued use of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland for agricultural uses by assisting in achieving groundwater sustainability within the Kern County Sub-basin. Impacts would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Agricultural Zoning and Williamson Act

Impact 3.2-2: The proposed project could conflict with existing zoning for agricultural use, or a Williamson Act contract. (*Less than Significant Impact with Mitigation*)

As discussed in Section 3.2.1, *Environmental Setting* in the project area there are lands that are under Williamson Act contracts, and there are lands zoned for agricultural use. Therefore, the potential exists for the proposed project to conflict with existing zoning for agricultural use or a Williamson Act contract.

As explained in Section 3.11, *Land Use and Planning*, the proposed project areas are currently zoned primarily as Exclusive Agriculture (A) and Limited Agriculture (A-1). According to Sections 19.12.020 and Section 19.14.020 of the County Zoning Ordinance, permitted uses for the Exclusive Agriculture and Limited Agriculture designations include water storage or groundwater recharge facilities. In addition, the proposed project is exempt from the County Zoning Ordinance per *Government Code* 53091, which states that the building and zoning ordinances "of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water…by a local agency." Therefore, the proposed project would not conflict with agricultural zoning. There would be no impact.

The Kern County Planning Department has adopted *Agricultural Preserve Standard Uniform Rules*, which identify land uses that are compatible within agricultural preserves established under the Williamson Act (Kern County 2013). The rules are designed to restrict land uses to those compatible with agriculture, including crop cultivation, livestock breeding, grazing operations, and dairies. The *Standard Uniform Rules* state that public water utility facilities are considered compatible uses. Therefore, the Kern Fan Conveyance Facilities would be considered compatible uses on lands under Williamson Act contract. The *Standard Uniform Rules* also state that groundwater recharge operations are compatible land uses on agricultural preserves if the preserve is used for commercial agriculture for at least seven months out of a twelve-month period (Kern County Planning Department 2009). Therefore, if the proposed recharge and recovery facilities would be located on Williamson Act lands, then during periods when the basins are not operated for water recharge or water management purposes, the basins would be used for agricultural purposes, such as annual farming, grazing, or fallowing. Farming and livestock grazing are considered compatible agricultural uses. Alternatively, groundwater recharge facilities are considered compatible land uses if the Land Use Contract is amended by the County Board of Supervisors to allow water recharge as the primary purpose of an "open space" contract.

Implementation of **Mitigation Measure AGR-1** would require compliance with the *Standard Uniform Rules* as applicable to avoid potential conflict with Williamson Act contracts. Impacts would be less than significant with mitigation.

Mitigation Measures

> **AGR-1:** For all portions of the project area under a Williamson Act contract, the use of the property would be managed as applicable in accordance with Kern County's *Agricultural Preserve Standard Uniform Rules*, which identify land uses that are compatible within agricultural preserves established under the Williamson Act.

Significance Determination

Less than Significant Impact with Mitigation

Conflict with Forest Land Zoning

Impact 3.2-3: The proposed project would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in *Public Resources Code* Section 12220(g)), timberland (as defined by *Public Resources Code* Section 4526), or timberland zoned Timberland Production (as defined by *Government Code* Section 51104(g)). (*No Impact*)

The proposed project does not include forest land. Therefore, the proposed project would not result in the loss of forest land or conversion of forest land to non-forest use. There would be no impact.

Mitigation Measures

None Required

Significance Determination

No Impact

Forest Land Loss/ Conversion

Impact 3.2-4: The proposed project would not result in the loss of forest land or conversion of forest land to non-forest use. (*No Impact*)

The proposed project does not include lands zoned as forest land, timberland, or timberland zoned Timberland Production. There would be no conflict with forest land zoning. There would be no impact.

Mitigation Measures

None Required

Significance Determination

No Impact

Farmland Conversion

Impact 3.2-5: The proposed project would not 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. (*No Impact*)

As stated above in Impact 3.2-1 through Impact 3.2-4, the proposed project would involve construction of groundwater recharge and recovery facilities and water conveyance facilities including a turnout at the California Aqueduct. The proposed project is compatible with land use on surrounding properties, which is primarily agriculture, as discussed above.

The proposed project would support agricultural resources in the region through groundwater recharge and conveyance facilities. The proposed project would be compatible with the goals and policies of the Kern County General Plan for protecting agricultural resources through the beneficial use of percolation basins and would reduce the potential for the Kern Fan groundwater recharge and conveyance areas to be converted to residential, commercial, and industrial uses. The proposed project would not indirectly induce further loss of farmland in the project area, as is typical of projects that convert agricultural lands to residential or commercial land uses.

The proposed project also would support agriculture in the Kern Fan area by reducing future overdraft conditions in the underlying groundwater basin and supporting sustainable management of the Kern County Sub-basin in the future as part of the Kern Groundwater Authority GSP. Implementing a banking program requires that water be recharged and stored prior to extraction. Furthermore, agricultural land uses, such as annual farming, grazing, or fallowing, would be allowed within the recharge basins at the Phase 1 and Phase 2 areas when not operated for water recharge or water management purposes. Additionally, implementation of Mitigation Measure

AGR-1 would ensure the Kern Fan Project Properties would be managed as applicable in accordance with Kern County's *Agricultural Preserve Standard Uniform Rules*.

As such, the proposed project would not 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. There would be no impact.

Mitigation Measures

None Required

Significance Determination

No Impact

Cumulative Impacts

Impact 3.2-6: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to agriculture and forestry resources. (*Less than Significant Impact with Mitigation*)

This section presents an analysis of the cumulative effects of the proposed project in combination with other present and reasonably foreseeable future projects that could generate cumulatively considerable impacts to agriculture and forestry resources. The geographic scope used to analyze cumulative impacts to agriculture is the San Joaquin Valley. As discussed above the proposed project would not involve the conversion of forested land nor would the proposed project be located on any forested land. As such, the project would have no impacts to forested land or conversion of forested land and would, in turn, not be cumulatively considerable for impacts to forestry resources. The project would, however, potentially impact agricultural lands in the project area. Discussion of the cumulative impact of the project on agricultural resources is provided below.

The cumulative impact of the proposed project on agricultural resources is dependent on the past, present, and reasonably-foreseeable future conditions of development and land use in the project vicinity. There is an abundance of land in the vicinity of the proposed project that is categorized as Prime Farmland, Unique Farmland, and Farmland of Statewide Importance (see Figure 3.2-1). Other related projects in the area could result in the conversion of agricultural lands. The projects to be considered cumulatively, together with the proposed project, are listed in Table 3-2. The projects in Table 3-2 include road improvements, management plans and water recharge, conveyance, and diversion. Rosedale serves as the lead agency for several of the projects considered for cumulative analysis. The water recharge and banking projects (Projects No. 3 to 10, 12 and 13) could be considered cumulative if they involve the conversion of agricultural lands in the greater San Joaquin Valley. However, similar to the proposed project, water utility infrastructure and groundwater recharge facilities are compatible with agricultural zoning and agricultural preserves.

The proposed project would not contribute to cumulative farmland conversion in conjunction with the projects discussed in Table 3-2. As discussed above, the proposed project would provide benefits to agriculture in the project vicinity by preventing the conversion of the proposed project area from farmland to residential or commercial development and preventing overdraft conditions in the underlying groundwater basin, upon which regional farmers depend for irrigation water, and supporting sustainable management of the Kern County Sub-basin in the future as part of the Kern Groundwater Authority GSP. Groundwater recharge is a compatible agricultural land use, and the proposed project would not convert agricultural lands to non-agricultural use

Additionally, the implementation of Mitigation Measure AGR-1 would ensure the Kern Fan Project Properties would be managed as applicable in accordance with Kern County's *Agricultural Preserve Standard Uniform Rules*. As such, the proposed project would not cumulatively contribute to impacts on agriculture and forestry resources.

Mitigation Measures

Implement Mitigation Measure AGR-1.

Significance Determination

Less than Significant Impact with Mitigation

3.2.4 References

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3.3 Air Quality

This section evaluates the potential for impacts related to air emissions generated by construction and operation of the proposed project. This section includes: a description of the existing air quality conditions regionally and in and around the proposed project area; a summary of applicable regulations related to air quality; and an evaluation of the potential impacts of the proposed project related to air quality in and around the project area, including cumulative impacts.

3.3.1 Environmental Setting

Existing Air Quality Conditions

General Meteorology and Topography

Air pollution, especially the dispersion of air pollutants, is directly related to a region's topographic features. Air quality is a function of both the rate and location of pollutant emissions and the meteorological conditions and topographic features that influence pollutant movement and dispersal. Atmospheric conditions such as wind speed, wind direction, atmospheric stability, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants, which affects ambient air quality.

The proposed project would be located in western Kern County, west of the City of Bakersfield, northwest of the Kern River and southeast of the California Aqueduct. The project lies within the San Joaquin Valley Air Basin (SJVAB), basically a flat area bordered on the east by the Sierra Nevada Mountains; on the west by the Coast Ranges; and to the south by the Tehachapi Mountains. Airflow in the SJVAB is primarily influenced by marine air that enters through the Carquinez Straits where the San Joaquin-Sacramento Delta empties into the San Francisco Bay (SJVAPCD 2002). The region's topographic features restrict air movement through and out of the SJVAB. As a result, the SJVAB is highly susceptible to pollutant accumulation over time (SJVAPCD 2002). Frequent transport of pollutants into the SJVAB from upwind sources also contributes to poor air quality.

Wind speed and direction play an important role in dispersion and transport of air pollutants. During summer periods, winds usually originate from the north end of the San Joaquin Valley and flow in a south-southeasterly direction through the valley, through the Tehachapi pass and into the neighboring Southeast Desert Air Basin. During winter months, winds occasionally originate from the south end of the valley and flow in a north-northwesterly direction. Also, during winter months, the valley experiences light, variable winds, less than 10 miles per hour (mph). Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high concentrations of certain air pollutants.

The SJVAB has an inland Mediterranean climate that is characterized by warm, dry summers and cooler winters. Summer high temperatures often exceed 100 degrees Fahrenheit (°F), averaging from the low 90s in the northern part of the valley to the high 90s in the south. The daily summer temperature variation can be as high as 30 degrees °F. Winters are for the most part mild and humid. Average high temperatures during the winter are in the 50s, while the average daily low temperature is approximately 45 degrees °F.

The vertical dispersion of air pollutants in the valley is limited by the presence of persistent temperature inversions. Air temperatures usually decrease with an increase in altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. Air above and below an inversion does not mix because of differences in air density thereby restricting air pollutant dispersal.

Existing Air Quality in the Study Area Vicinity

The San Joaquin Valley Air Pollution Control District (SJVAPCD) maintains a network of air quality monitoring stations located throughout the SJVAB. The monitoring stations record concentrations of air pollutants including: ozone; carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM10), particulate matter less than 2.5 microns in diameter (PM2.5), lead (Pb), and sulfates (SO_4). The monitored ambient air pollutant concentrations reflect the number and strength of emissions sources and the influence of topographical and meteorological factors.

The monitoring station closest to and most representative of air quality conditions at the project area is at 548 Walker Street Station in Shafter, approximately five miles north of the project area. The nearest station monitoring for PM10 and PM2.5 is located at 5558 California Avenue in Bakersfield, approximately 16 miles northeast of the project area. As PM is a localized pollutant, data from the California Avenue station would not be representative of concentrations in the project area. In addition, the California Avenue station is located within an urban area unlike the project area, which is rural in nature. **Table 3.3-1** presents the most recent available three-year summary of air pollutant (concentration) data collected at these nearest monitoring stations for the three criteria air pollutants ozone, PM10, and PM2.5 for which the SJVAB is currently in "nonattainment" with State and national ambient air quality standards. As shown in Table 3.3-1, these measured air pollutant concentrations are compared with State and national ambient air quality standards and exceedances are identified.

Sensitive Receptors

Land uses such as schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because infants and children, the elderly, and people with health afflictions, especially respiratory ailments, are more susceptible than the general public. Residential areas are also considered to be sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Industrial and commercial districts are less sensitive to poor air quality because exposure periods are shorter and workers in these districts are, in general, the healthier segment of the public.

The proposed project site is located in a rural area characterized by agriculture uses and scattered single-family residences. The closest relatively densely-populated residential sensitive receptors are located within the proposed Phase 1 project area south of Highway 58 between Nord Avenue and Heath Road. The project area also is located within a quarter-mile of the Del Rio Elementary School and Bakersfield Christian High School, located at 600 Hidalgo Drive and 12775 Stockdale Highway, respectively. There are no churches, hospitals, local police or fire stations within a mile radius of the project area.

Criteria Air Pollutants

Elevated concentrations of certain air pollutants in the atmosphere have been recognized to cause notable health problems and consequential damage to the environment either directly or in reaction with other pollutants. In the United States, such pollutants have been identified and are regulated as part of the overall endeavor to prevent further deterioration and facilitate improvement in air quality. The following pollutants are regulated by the United States Environmental Protection Agency (USEPA) and are subject to emissions control requirements adopted by federal, State and local regulatory agencies. These pollutants are referred to as "criteria air pollutants" as a result of the specific standards, or criteria, which have been adopted pertaining to them. The USEPA established the National Ambient Air Quality Standards (NAAQS) to "provide public health protection, including protecting the health of 'sensitive' populations such as asthmatics, children, and the elderly," (USEPA 2016a) allowing "an adequate margin of safety" (42 *USC* Section 7409; *CAA* Section 109). California Ambient Air Quality Standards (CAAQS) were "established to protect the health of the most sensitive groups in our communities" and "defines the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without any harmful effects on people or the environment" (CARB 2020a). NAAQS and CAAQS for each of the monitored pollutants and their effects on health are discussed below.

TABLE 3.3-1
AIR QUALITY DATA SUMMARY (2016-2018)

	Monitoring Data by Year		
Pollutant	**2016**	**2017**	**2018**
Ozone – Shafter -Walker St Station			
Highest 1 Hour Average (ppm)[b]	**0.096**	**0.094**	**0.098**
Days over State Standard (0.09 ppm)[a]	1	0	4
Highest 8 Hour Average (ppm)[b]	**0.087**	**0.082**	**0.090**
Days over National Standard (0.075 ppm)[a]	25	8	12
Days over State Standard (0.07 ppm)[a]	50	30	35
Particulate Matter (PM10) – Bakersfield – 5558 California Ave Station			
Highest 24 Hour Average – State/National ($\mu g/m^3$)[b]	**92.2**/90.9	**143.6**/138.0	**142.0**/136.1
Days (Measured) over National Standard (150 $\mu g/m^3$)[a,c]	0	0	0
Days (Measured) over State Standard (50 $\mu g/m^3$)[a,c]	21	16	13
State Annual Average (State Standard 20 $\mu g/m^3$)[a,b]	**40.9**	**42.6**	**42.1**
Particulate Matter (PM2.5) – Bakersfield - 5558 California Ave Station			
Highest 24 Hour Average– National ($\mu g/m^3$)[b]	**66.4**	**101.8**	**98.5**
Days (Measured) over National Standard (35 $\mu g/m^3$)[a,c]	23	28	36
State Annual Average	**16.0**	**15.9**	**15.7**

a Generally, State standards and national standards are not to be exceeded more than once per year.
b ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.
c PM10 and PM2.5 is not measured every day of the year. Number of estimated days over the standard is based on 365 days per year.
* = Insufficient data available to determine value; NA = Not Available. Values in **Bold** exceed the respective air quality standard.
SOURCE: California Air Resources Board, 2020.

Ozone

Ozone is a secondary pollutant formed by the chemical reaction of volatile organic compounds (VOCs) and nitrogen oxides (NO_X) in the presence of sunlight under certain meteorological conditions, such as high temperature and stagnation episodes. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable.

According to the USEPA, ozone can cause the muscles in the airways to constrict potentially leading to wheezing and shortness of breath (USEPA 2019a). Ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema and chronic bronchitis; increase the frequency of asthma attacks; make the lungs more susceptible to infection; continue to damage the lungs even when the symptoms have disappeared; and cause chronic obstructive pulmonary disease (USEPA 2019a).

Long-term exposure to ozone is linked to aggravation of asthma and is likely to be one of many causes of asthma development. Long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children (USEPA 2019a). According to the California Air Resources Board (CARB), inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms, and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath (CARB 2020b).

The USEPA states that people most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers (USEPA 2019a). Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure (USEPA 2019a). According to CARB, studies show that children are no more or less likely to suffer harmful effects than adults; however, children and teens may be more susceptible to ozone and other pollutants because they spend nearly twice as much time outdoors and engaged in vigorous activities compared to adults (CARB 2020b). Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults and are less likely than adults to notice their own symptoms and avoid harmful exposures (CARB 2020b). Further research may be able to better distinguish between health effects in children and adults (CARB 2020b).

Volatile Organic Compounds

VOCs, also referred to as reactive organic gases (ROGs), are organic chemical compounds of carbon and are not "criteria" air pollutants themselves; however, in combination with NO_X they form ozone, and are regulated to prevent the formation of ozone (CARB 2004c; USEPA 2017a). According to CARB, some VOCs are highly reactive and play a critical role in the formation of ozone. Potential health effects of ozone exposure are discussed above. Other VOCs can result in adverse health effects from direct exposure and are classified by the State of California as toxic air contaminants or Hazardous Air Pollutants (HAPs) by the USEPA (CARB 2020c; USEPA 2018a). The health effects of VOCs, as TACs/HAPs, are discussed more thoroughly below.

VOCs are typically formed from combustion of fuels and/or released through evaporation of organic liquids. Fuel combustion can occur in internal combustion sources, such as motor vehicle usage, landscape and other portable equipment, and stationary generators, or external combustion, such as for water and space heating. Evaporation sources include fueling operations, consumer products (e.g., cleaning solutions), and architectural coatings (USEPA 2017b).

Carbon Monoxide (CO)

CO is primarily emitted from combustion processes and motor vehicles due to the incomplete combustion of fuel, such as natural gas, gasoline, or wood, with the majority of outdoor CO emissions from mobile sources (CARB 2020e).

According to the USEPA, breathing air with a high concentration of CO reduces the amount of oxygen that can be transported in the blood stream to critical organs like the heart and brain and at very high levels, which are possible indoors or in other enclosed environments, CO can cause dizziness, confusion, unconsciousness and death (USEPA 2016c). Very high levels of CO are not likely to occur outdoors; however, when CO levels are elevated outdoors, they can be of particular concern for people with some types of heart disease since these people already have a reduced ability for getting oxygenated blood to their hearts and are especially vulnerable to the effects of CO when exercising or under increased stress (USEPA 2016c). In these situations, short-term exposure to elevated CO may result in reduced oxygen to the heart accompanied by chest pain also known as angina (USEPA 2016c).

According to CARB, the most common effects of CO exposure are fatigue, headaches, confusion, and dizziness due to inadequate oxygen delivery to the brain (CARB 2020e). For people with cardiovascular disease, short-term CO exposure can further reduce their body's already compromised ability to respond to the increased oxygen demands of exercise, exertion, or stress; inadequate oxygen delivery to the heart muscle leads to chest pain and decreased exercise tolerance (CARB 2020e). Unborn babies, infants, elderly people, and people with anemia or with a history of heart or respiratory disease are most likely to experience health effects with exposure to elevated levels of CO (CARB 2020e).

Carbon monoxide CO concentrations have declined dramatically in California due to existing controls and programs and most areas of the State including the Station Area Plan region have no problem meeting the carbon monoxide State and federal standards. CO measurements and modeling were important in the early 1980's when CO levels were regularly exceeded throughout California. In more recent years, CO measurements and modeling have not been a priority in most California air districts due to the retirement of older polluting vehicles, less emissions from new vehicles and improvements in fuels. The clear success in reducing CO levels is evident in the first paragraph of the executive summary of the California Air Resources Board *2004 Revision to the California State Implementation Plan for Carbon Monoxide Updated Maintenance Plan for Ten Federal Planning Areas* (CARB 2004a), shown below:

> *"The dramatic reduction in carbon monoxide (CO) levels across California is one of the biggest success stories in air pollution control. Air Resources Board (ARB or Board) requirements for cleaner vehicles, equipment and fuels have cut peak CO levels in half since*

1980, despite growth. All areas of the State designated as non-attainment for the federal 8-hour CO standard in 1991 now attain the standard, including the Los Angeles urbanized area. Even the Calexico area of Imperial County on the congested Mexican border had no violations of the federal CO standard in 2003. Only the South Coast and Calexico continue to violate the more protective State 8-hour CO standard, with declining levels beginning to approach that standard."

Suspended Particulate Matter (PM10 and PM2.5)

Particulate matter air pollution is a mixture of solid particles and liquid droplets found in the air (USEPA 2018b). Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye while other particles are so small they can only be detected using an electron microscope (USEPA 2018b). Particles are defined by their diameter for air quality regulatory purposes: inhalable particles with diameters that are generally 10 micrometers and smaller (PM10); inhalable particles with diameters that are 2.5 micrometers or less (PM2.5) (USEPA 2018b). Thus, PM2.5 comprises a portion or a subset of PM10.

Sources of PM10 emissions include dust from construction sites, landfills and agriculture, wildfires and brush/waste burning, industrial sources, and wind-blown dust from open lands (CARB 2020g). Sources of PM2.5 emissions include combustion of gasoline, oil, diesel fuel, or wood (CARB 2020g). PM10 and PM2.5 may be either directly emitted from sources (primary particles) or formed in the atmosphere through chemical reactions of gases (secondary particles) such as SO_2, NO_X, and certain organic compounds (CARB 2020g).

According to CARB, both PM10 and PM2.5 can be inhaled, with some depositing throughout the airways; PM10 is more likely to deposit on the surfaces of the larger airways of the upper region of the lung, while PM2.5 is more likely to travel into and deposit on the surface of the deeper parts of the lung, which can induce tissue damage, and lung inflammation (CARB 2020g). Short-term (up to 24-hours duration) exposure to PM10 has been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits (CARB 2020g). The effects of long-term (months or years) exposure to PM10 are less clear, although studies suggest a link between long-term PM10 exposure and respiratory mortality. The International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer (CARB 2020g).

Short-term exposure to PM2.5 has been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. Long-term exposure to PM2.5 has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children (CARB 2020g). According to CARB, populations most likely to experience adverse health effects with exposure to PM10 and PM2.5 include older adults with chronic heart or lung disease, children, and asthmatics. Children and infants are more susceptible to harm from inhaling pollutants such as PM10 and PM2.5 compared to healthy adults because they inhale more air per pound of body weight than do adults, spend more time outdoors, and have developing immune systems (CARB 2020g).

Nitrogen Dioxide (NO_2)

NO_X is a term that refers to a group of compounds containing nitrogen and oxygen. As mentioned above, NO_X combines with VOCs to form ozone. The health effects associated with the formation of ozone were discussed above under Ozone. The primary compounds of air quality concern include NO_2 and nitric oxide (NO). Ambient air quality standards have been promulgated for NO_2, which is a reddish-brown, reactive gas (CARB 2020d).

The principal form of NO_X produced by combustion is NO, but NO reacts quickly in the atmosphere to form NO_2, creating the mixture of NO and NO_2 referred to as NO_X. Major sources of NO_X include emissions from cars, trucks and buses, power plants, and off-road equipment. The terms NO_X and NO_2 are sometimes used interchangeably. However, the term NO_X is typically used when discussing emissions, usually from combustion-related activities, and the term NO_2 is typically used when discussing ambient air quality standards. Where NO_X emissions are discussed in the context of the thresholds of significance or impact analyses, the discussions are based on the conservative assumption that all NO_X emissions would oxidize in the atmosphere to form NO_2.

According to the USEPA, short-term exposures to NO_2 can potentially aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms while longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections (USEPA 2016b). According to CARB, controlled human exposure studies that show that NO_2 exposure can intensify responses to allergens in allergic asthmatics (CARB 2020d).

In addition, a number of epidemiological studies have demonstrated associations between NO_2 exposure and premature death, cardiopulmonary effects, decreased lung function growth in children, respiratory symptoms, emergency room visits for asthma, and intensified allergic responses (CARB 2020d). Infants and children are particularly at risk from exposure to NO_2 because they have disproportionately higher exposure to NO_2 than adults due to their greater breathing rate for their body weight and their typically greater outdoor exposure duration while in adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease (CARB 2020d).

CARB states that much of the information on distribution in air, human exposure and dose, and health effects is specifically for NO_2 and there is only limited information for NO and NO_X, as well as large uncertainty in relating health effects to NO or NO_X exposure (CARB 2020d).

Sulfur dioxide (SO_2)

According to the USEPA, the largest source of SO_2 emissions in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities while smaller sources of SO_2 emission include industrial processes such as extracting metal from ore; natural sources such as volcanoes; and locomotives, ships and other vehicle and heavy equipment that burn fuel with a high sulfur content (USEPA 2019b). In 2006, California phased-in the ultra-low-sulfur diesel regulation limiting vehicle diesel fuel to a sulfur content not exceeding 15 parts per million, down from the

previous requirement of 500 parts per million, substantially reducing emissions of sulfur from diesel combustion (CARB 2004b).

According to the USEPA, short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult (USEPA 2019b). According to CARB, health effects at levels near the State one-hour standard are those of asthma exacerbation, including bronchoconstriction accompanied by symptoms of respiratory irritation such as wheezing, shortness of breath and chest tightness, especially during exercise or physical activity and exposure at elevated levels of SO_2 (above 1 parts per million [ppm]) results in increased incidence of pulmonary symptoms and disease, decreased pulmonary function, and increased risk of mortality (CARB 2020f). Children, the elderly, and those with asthma, cardiovascular disease, or chronic lung disease (such as bronchitis or emphysema) are most likely to experience the adverse effects of SO_2 (CARB 2020f; USEPA 2019b).

Lead

Major sources of lead emissions include ore and metals processing, piston-engine aircraft operating on leaded aviation fuel, waste incinerators, utilities, and lead-acid battery manufacturers (USEPA 2017c). In the past, leaded gasoline was a major source of lead emissions; however, the removal of lead from gasoline has resulted in a decrease of lead in the air by 98 percent between 1980 and 2014 (USEPA 2017c).

Lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system, and affects the oxygen carrying capacity of blood (USEPA 2017c). The lead effects most commonly encountered in current populations are neurological effects in children, such as behavioral problems and reduced intelligence, anemia, and liver or kidney damage (CARB 2020h). Excessive lead exposure in adults can cause reproductive problems in men and women, high blood pressure, kidney disease, digestive problems, nerve disorders, memory and concentration problems, and muscle and joint pain (CARB 2020h).[1]

California Only Criteria Pollutants

The California Ambient Air Quality Standards regulate the same criteria pollutants as the NAAQS but in addition, regulate State-identified criteria pollutants, including sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride (CARB 2020a). With respect to the State-identified criteria pollutants (i.e., sulfates, hydrogen sulfide, visibility reducing particles, and vinyl chloride), the Project would either not emit them (i.e., hydrogen sulfide and vinyl chloride), or they would be accounted for as part of the pollutants estimated in this analysis (i.e., sulfates and visibility reducing particles). For example, visibility reducing particles are associated with particulate matter emissions and sulfates are associated with SO_2 emissions. Both particulate matter and SO_2 are included in the emissions estimates for the project. A description of the health effects of the State-identified criteria air pollutants is provided below.

[1] While the SJVAPCD Guidance for Assessing and Mitigating Air Quality Impacts and Air Quality Thresholds of Significance – Criteria Pollutants do not have a specific threshold of significance for lead, project construction and operation would not include sources of lead emissions. As a result, lead emissions are not further evaluated.

Sulfates (SO_4^{2-}): Sulfates in the environment occur as a result of SO_2 (sulfur dioxide) being converted to SO_4^{2-} compounds in the atmosphere where sulfur is first oxidized to SO_2 during the combustion process of sulfur containing, petroleum-derived fuels (e.g., gasoline and diesel fuel) (CARB 2020i). Exposure to SO_4^{2-}, which are part of PM2.5, results in health effects similar to those from exposure to PM2.5 including reduced lung function, aggravated asthmatic symptoms, and increased risk of emergency department visits, hospitalizations, and death in people who have chronic heart or lung diseases (CARB 2020i). Population groups with higher risks of experiencing adverse health effects with exposure to SO_4^{2-} include children, asthmatics, and older adults who have chronic heart or lung diseases (CARB 2020i).

Hydrogen Sulfide (H_2S): H_2S is a colorless gas with a strong odor of rotten eggs. The most common sources of H_2S emissions are oil and natural gas extraction and processing, and natural emissions from geothermal fields. Industrial sources of H_2S include petrochemical plants and Kraft paper mills. H_2S is also formed during bacterial decomposition of human and animal wastes, and is present in emissions from sewage treatment facilities and landfills (CARB 2020j). Exposure to H_2S can induce tearing of the eyes and symptoms related to overstimulation of the sense of smell, including headache, nausea, or vomiting; additional health effects of eye irritation have only been reported with exposures greater than 50 ppm, which is considerably higher than the odor threshold (CARB 2020j). H_2S is regulated as a nuisance based on its odor detection level; if the standard were based on adverse health effects, it would be set at a much higher level (CARB 2020j). According to CARB, there are insufficient data available to determine whether or not some groups are at greater risk than others (CARB 2020j).

Visibility-Reducing Particles: Visibility-reducing particles are any particles in the atmosphere that obstruct the range of visibility by creating haze (CARB 2020k). These particles vary in shape, size and chemical composition, and come from a variety of natural and manmade sources including windblown metals, soil, dust, salt, and soot. Other haze-causing particles are formed in the air from gaseous pollutant (e.g., sulfates, nitrates, organic carbon particles) which are the major constituents of fine PM, such as PM2.5 and PM10, and are caused from the combustion of fuel. CARB's standard for visibility reducing particles is not based on health effects, but rather on welfare effects, such as reduced visibility and damage to materials, plants, forests, and ecosystems. The health impacts associated with PM2.5 and PM10 are discussed above under Particulate Matter.

Vinyl Chloride: Vinyl chloride is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products and are generally emitted from industrial processes and other major sources of vinyl chloride have been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents (CARB 2020l). Short-term health of effects of exposure to high levels of vinyl chloride in the air include central nervous system effects, such as dizziness, drowsiness, and headaches while long-term exposure to vinyl chloride through inhalation and oral exposure causes liver damage and has been shown to increase the risk of angiosarcoma, a rare form of liver cancer in humans (CARB 2020l). Most health data on vinyl chloride relate to carcinogenicity; thus, the people most at risk are those who have long-term exposure to elevated levels, which is more likely to occur in

occupational or industrial settings; however, control methodologies applied to industrial facilities generally prevent emissions to the ambient air (CARB 2020l).

Air Toxics

Toxic Air Contaminants

Toxic air contaminants (TACs), or Hazardous Air Pollutants (HAPs), as defined by the USEPA, are defined as those contaminants that are known or suspected to cause serious health problems, but do not have a corresponding ambient air quality standard (USEPA 2017d). For consistency within this document they will be referred to as TACs. TACs are also defined as an air pollutant that may increase a person's risk of developing cancer and/or other serious health effects. TACs are emitted by a variety of industrial processes such as petroleum refining, electric utility and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. TACs may exist as PM10 and PM2.5 or as vapors (gases). TACs include metals, other particles, gases absorbed by particles, and certain vapors from fuels and other sources. The emission of a TAC does not automatically create a health hazard. Other factors, such as the amount of the TAC, its toxicity, how it is released into the air, the weather, and the terrain, all influence whether the emission could be hazardous to human health. Emissions of TACs into the air can be damaging to human health and to the environment. Human exposure to TACs at sufficient concentrations and durations can result in cancer, poisoning, and rapid onset of sickness, such as nausea or difficulty in breathing. Other less measurable effects include immunological, neurological, reproductive, developmental, and respiratory problems. TACs deposited onto soil or into lakes and streams affect ecological systems and eventually human health through consumption of contaminated food. The carcinogenic potential of TACs is a particular public health concern because many scientists currently believe that there is no "safe" level of exposure to carcinogens. Any exposure to a carcinogen poses some risk of contracting cancer (CARB 2020m).

The public's exposure to TACs is a significant public health issue in California. The Air Toxics "Hotspots" Information and Assessment Act is a State law requiring facilities to report emissions of TACs to air districts (CARB 2020m). The program is designated to quantify the amounts of potentially HAPs released, the location of the release, the concentrations to which the public is exposed, and the resulting health risks. The State Air Toxics Program (AB 2588) identified over 200 TACs, including the 188 TACs identified in the Clean Air Act (CAA) (CARB 2020m).

The USEPA has assessed this expansive list and identified 21 TACs as Mobile Source Air Toxics (MSATs) (USEPA 2004). MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. USEPA also extracted a subset of these 21 MSAT compounds that it now labels as the nine priority MSATs: 1,3-butaidene, acetaldehyde, acrolein, benzene, diesel particulate matter (DPM)/diesel exhaust organic gases, ethylbenzene, naphthalene, and polycyclic organic matter (POM). While these nine MSATs are considered the priority transportation toxics, USEPA stresses that the lists are subject to change and may be adjusted in future rules (USDOT 2016).

Diesel Exhaust: According to the California Almanac of Emissions and Air Quality, the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate matter from the exhaust of diesel-fueled engines, i.e., DPM (CARB 2020n). DPM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances.

Diesel exhaust is composed of two phases, gas and particle, and both phases contribute to the health risk. The gas phase is composed of many of the urban HAPs, such as acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde and polycyclic aromatic hydrocarbons. The particle phase is also composed of many different types of particles by size or composition. Fine and ultra-fine diesel particulates are of the greatest health concern and may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals and other trace elements. Diesel exhaust is emitted from a broad range of diesel engines; the on-road diesel engines of trucks, buses and cars and the off-road diesel engines that include locomotives, marine vessels and heavy-duty equipment. Although DPM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present.

The most common exposure to DPM is breathing air that contains diesel exhaust. The fine and ultra-fine particles are respirable (similar to PM2.5), which means that they can avoid many of the human respiratory system defense mechanisms and enter deeply into the lung. Exposure to DPM comes from both on-road and off-road engine exhaust that is either directly emitted from the engines or lingering in the atmosphere.

Diesel exhaust causes health effects from long-term chronic exposures. The type and severity of health effects depends upon several factors including the amount of chemical exposure and the duration of exposure. Individuals also react differently to different levels of exposure. There is limited information on exposure to only DPM, but there is enough evidence to indicate that inhalation exposure to diesel exhaust causes chronic health effects as well as having cancer-causing potential.

Because it is part of PM2.5, DPM also contributes to the same non-cancer health effects as PM2.5 exposure. These effects include premature death, hospitalizations and emergency department visits for exacerbated chronic heart and lung disease, including asthma, increased respiratory symptoms, and decreased lung function in children. Several studies suggest that exposure to DPM may also facilitate development of new allergies. Those most vulnerable to non-cancer health effects are children whose lungs are still developing and the elderly who often have chronic health problems (CARB 2020n).

Airborne Fungus (Valley Fever)

Coccidioidomycosis, commonly referred to as San Joaquin Valley Fever or Valley Fever, is one of the most studied and oldest known fungal infections. Valley Fever most commonly affects people who live in hot dry areas with alkaline soil and varies with the season. This disease, which affects both humans and animals, is caused by inhalation of arthroconidia (spores) of the fungus *Coccidioides immitis* (CI). CI spores are found in the top few inches of soil and the existence of

the fungus in most soil areas is temporary. The cocci fungus lives as a saprophyte in dry, alkaline soil. When weather and moisture conditions are favorable, the fungus "blooms" and forms many tiny spores that lie dormant in the soil until they are stirred up by wind, vehicles, excavation, or other ground-moving activities and become airborne. Agricultural workers, construction workers, and other people who work outdoors and who are exposed to wind and dust are more likely to contract Valley Fever. Children and adults whose hobbies or sports activities expose them to wind and dust are also more likely to contract Valley Fever. After the fungal spores have settled in the lungs, they change into a multicellular structure called a spherule. Fungal growth in the lungs occurs as the spherule grows and bursts, releasing endospores, which then develop into more spherules.

Approximately 60 percent of Valley Fever cases are mild and display flu-like symptoms or no symptoms at all. Of those who are exposed and seek medical treatment, the most common symptoms include fatigue, cough, loss of appetite, rash, headache, and joint aches. In some cases, painful red bumps may develop on the skin. One important fact to mention is that these symptoms are not unique to Valley Fever and may be caused by other illnesses as well. Identifying and confirming this disease require specific laboratory tests such as: (1) microscopic identification of the fungal spherules in infected tissue, sputum or body fluid sample; (2) growing a culture of *CI* from a tissue specimen, sputum, or body fluid; (3) detection of antibodies (serological tests specifically for Valley Fever) against the fungus in blood serum or other body fluids; and (4) administering the Valley Fever Skin Test (called coccidioidin or spherulin), which indicate prior exposure to the fungus (Valley Fever Center for Excellence 2019).

Valley Fever is not contagious and, therefore, cannot be passed on from person to person. Most of those who are infected would recover without treatment within six months and would have a life-long immunity to the fungal spores. In severe cases, especially in those patients with rapid and extensive primary illness, those who are at risk for dissemination of disease, and those who have disseminated disease, antifungal drug therapy is used. The type of medication used and the duration of drug therapy are determined by the severity of disease and response to the therapy. The medications used include ketoconazole, itraconazole and fluconazole in chronic, mild-to-moderate disease, and amphotericin B, given intravenously or inserted into the spinal fluid, for rapidly progressive disease. Although these treatments are often helpful, evidence of disease may persist and years of treatment may be required (Valley Fever Center for Excellence 2019).

3.3.2 Regulatory Setting

Federal

Clean Air Act

The federal CAA requires the U.S. Environmental Protection Agency (EPA) to identify National Ambient Air Quality Standards (NAAQS), or (national standards) to protect public health and welfare. National standards have been established for ozone, CO, NO_2, SO_2, respirable particulate matter (PM10 and PM2.5), and lead. These pollutants are called “criteria” air pollutants because standards have been established for each of them to meet specific public health and welfare criteria set forth in the FCAA. California has adopted more stringent ambient air quality standards for the criteria air pollutants, referred to as California Ambient Air Quality Standards (CAAQS), or state

standards, and air quality standards for some pollutants for which there is no corresponding national standard. **Table 3.3-2** presents current national and State ambient air quality standards.

TABLE 3.3-2
NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Average Time	California Standards[a]		National Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
Ozone[h]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
NO_2[i]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemi-luminescence	100 ppb (188 µg/m^3)	None	Gas Phase Chemi-luminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		53 ppb (100 µg/m^3)	Same as Primary Standard	
CO	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10mg/m^3)		9 ppm (10 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
SO_2[j]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Fluorescence; Spectro-photometry (Pararosaniline Method)[9]
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[j]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[j]	—	
PM10[k]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
PM2.5[k]	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^{3k}	15 µg/m^3	
Lead[l,m]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[m]	Same as Primary Standard	
	Rolling 3-Month Average[m]	--		0.15 µg/m^3		
Visibility-Reducing Particles[n]	8 Hour	Extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.		**No Federal Standards**		

TABLE 3.3-2
NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Average Time	California Standards[a]		National Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
Sulfates (SO_4)	24 Hour	25 µg/m^3	Ion Chromatography	**No Federal Standards**		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence	**No Federal Standards**		
Vinyl Chloride[l]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography	**No Federal Standards**		

NOTES:

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

[b] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 micrograms/per cubic meter (µg/m^3) is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

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

[d] Any equivalent procedure which can be shown to the satisfaction of the California Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.

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

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

[g] Reference method as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.

[h] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[i] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb.

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

[k] On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3.

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

[m] The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated non-attainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

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

SOURCE: CARB 2016; CARB 2020a–l

Pursuant to the 1990 Federal Clean Air Act Amendments (CAAA), the EPA classifies air basins (or portions thereof) as “attainment” or “nonattainment” for each criteria air pollutant, based on whether or not the NAAQS had been achieved. **Table 3.3-3** shows the current NAAQS attainment status of the project area (i.e., SJVAB).

The federal CAA requires each state to prepare an air quality management plan, referred to as a State Implementation Plan (SIP). The federal CAA Amendments added requirements for states containing areas that violate the NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. A SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The EPA has responsibility to review all state SIPs to determine if they conform to the mandates of the federal CAA Amendments and will achieve air quality goals when implemented.

TABLE 3.3-3
SAN JOAQUIN VALLEY ATTAINMENT STATUS

Pollutant	Designation/Classification	
	Federal Standards	**State Standards**
Ozone – one hour	No Federal Standard[1]	Nonattainment/Severe
Ozone – eight hour	Nonattainment/Extreme[2]	Nonattainment
PM10	Attainment[3]	Nonattainment
$PM_{2.5}$	Nonattainment[4]	Nonattainment
CO	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment/Unclassified	Attainment
Sulfur Dioxide	Attainment/Unclassified	Attainment
Lead (particulate)	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Vinyl Chloride	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified

1 Effective June 15, 2005, the U.S. Environmental Protection Agency (EPA) revoked the federal 1-hour ozone standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB.

2 Though the Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).

3 On September 25, 2008, EPA redesignated the San Joaquin Valley to attainment for the PM10 National Ambient Air Quality Standard (NAAQS) and approved the PM10 Maintenance Plan.

4 The Valley is designated nonattainment for the 1997 PM2.5 NAAQS. EPA designated the Valley as nonattainment for the 2006 PM2.5 NAAQS on November 13, 2009 (effective December 14, 2009).

SOURCE: SJVAPCD, 2020, *Ambient Air Quality Standards and Valley Attainment Status*, www.valleyair.org/aqinfo/attainment.htm, accessed July 29, 2020.

Regulation of TACs, or HAPs under federal regulations, is achieved through federal, State and local controls on individual sources. The SJVAPCD regulates TACs as defined by the State in Policies 1905 and 1910, and in Regulation VII. The SJVAPCD recognizes all TAC's. The district recognizes federal Maximum Achievable Control Technology (MACT) standards for HAP's in SJVAPCD Rule 4002.

State

California Clean Air Act and Air Quality Standards

California has adopted ambient air quality standards for the criteria air pollutants that are more stringent than the federal standards, as shown in **Table 3.3-2**. Under the California Clean Air Act (CCAA), patterned after the federal CAA, areas are designated as attainment or nonattainment with respect to the State standards. **Table 3.3-3** summarizes the attainment status with California ambient air quality standards in the project area (i.e., SJVAB).

California Air Resources Board

CARB manages air quality, regulates mobile emissions sources, and oversees the activities of county APCDs and regional AQMDs. CARB establishes state ambient air quality standards and vehicle emissions standards.

Toxic Air Contaminants (TACs)

The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (federal) HAPs adopted in accordance with AB 2728. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. Toxic air contaminant emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings.

In August of 1998, CARB identified particulate emissions from diesel-fueled engines (diesel particulate matter, or DPM) as TACs. ARB subsequently developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB 2000). The document represents proposals to reduce diesel particulate emissions, with the goal of reducing emissions and associated health risks by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed diesel particulate filters and ultra-low sulfur diesel fuel on diesel-fueled engines.

CARB published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB 2005) with the goal of providing information that will help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of air pollution. The handbook highlights recent studies that have shown that public exposure to air pollution can be substantially elevated near freeways and certain other facilities. However, the health risk is greatly reduced with distance. For that reason, CARB provided some general recommendations aimed at keeping appropriate distances between sources of air pollution and sensitive land uses, such as residences.

On-Road and Off-Road Vehicle and Equipment Rules

Heavy-Duty Vehicles and Equipment

In 2004, CARB adopted an Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel PM and other TACs. The measure applies

to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel-fueled commercial vehicles to idle for more than 5 minutes at any given time.

In 2008 CARB approved the Truck and Bus Regulation to reduce NO_X, PM10, and PM2.5 emissions from existing diesel vehicles operating in California. The requirements were amended in December 2010 and apply to nearly all diesel fueled trucks and busses with a gross vehicle weight rating greater than 14,000 pounds. For the largest trucks in the fleet (i.e., those with a gross vehicle weight rating greater than 26,000 pounds), there are two methods to comply with the requirements. The first method is for the fleet owner to retrofit or replace engines, starting with the oldest engine model year, to meet 2010 engine standards, or better. This is phased over eight years, starting in 2015 and would be fully implemented by 2023, meaning that all trucks operating in the State subject to this option would need to meet or exceed the 2010 engine emission standards for NO_X and PM by 2023. The second option, if chosen, requires fleet owners, starting in 2012, to retrofit a portion of their fleet with diesel particulate filters achieving at least 85 percent removal efficiency, so that by January 1, 2016, their entire fleet is equipped with diesel particulate filters. However, diesel particulate filters do not typically lower NO_X emissions. Thus, fleet owners choosing the second method must still comply with the 2010 engine emission standards for their trucks and busses by 2020. Beginning January 1, 2020, this requirement will be enforced by the California Department of Motor Vehicles (DMV). Senate Bill 1 (SB 1), the Road Repair and Accountability Act of 2017, was signed into law on April 28, 2017. SB 1 authorizes the DMV to check that vehicles are compliant with or exempt from CARB's Truck and Bus Regulation. If a vehicle is not compliant with the rule, DMV will no longer register that vehicle starting January 1, 2020.

In addition to limiting exhaust from idling trucks, CARB adopted the In-Use Off-Road Diesel Vehicle Regulation that promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles. The regulation adopted by CARB on July 26, 2007, aims to reduce emissions by installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models. Implementation is staggered based on fleet size (which is the total of all off-road horsepower under common ownership or control), with the largest fleets to begin compliance by January 1, 2014. Each fleet must demonstrate compliance through one of two methods. The first option is to calculate and maintain fleet average emissions targets, which encourages the retirement or repowering of older equipment and rewards the introduction of newer cleaner units into the fleet. The second option is to meet the Best Available Control Technology (BACT) requirements by turning over or installing Verified Diesel Emission Control Strategies (e.g., engine retrofits) on a certain percentage of its total fleet horsepower. The compliance schedule requires that BACT turn overs or retrofits be fully implemented by 2023 in all equipment in large and medium fleets and across 100 percent of small fleets by 2028.

Local

San Joaquin Air Pollution Control District

The SJVAPCD is the primary local agency responsible for protecting human health and property from the harmful effects of air pollution in the SJVAB, and has jurisdiction over most stationary source air quality matters in the SJVAB. The SJVAPCD includes all of Merced, San Joaquin, Stanislaus, Madera, Fresno, Kings and Tulare counties, and the Valley portion of Kern County.

The SJVAPCD is responsible for developing attainment plans for the SJVAB, for inclusion in California's SIP, as well as establishing and enforcing air pollution control rules and regulations. The attainment plans must demonstrate compliance with federal and State ambient air quality standards, and must first be approved by CARB before inclusion into the SIP. The SJVAPCD regulates, permits, and inspects stationary sources of air pollution. Among these sources are industrial facilities, gasoline stations, auto body shops, MSW landfills and dry cleaners to name a few. While the State is responsible for emission standards and controlling actual tailpipe emissions from motor vehicles, the SJVAPCD is required to regulate emissions associated with stationary sources such as agricultural burning and industrial operations. The SJVAPCD also works with eight local transportation planning agencies to implement transportation control measures, and to recommend mitigation measures for new growth and development designed to reduce the number of cars on the road. The SJVAPCD promotes the use of cleaner fuels, and funds a number of public and private agency projects that provide innovative approaches to reducing air pollution from motor vehicles.

While all criteria pollutants are a concern of the SJVAPCD, a project's air quality impacts are considered significant if they would violate any of the State air quality standards. Ozone precursors, PM10 emissions and toxic air contaminants are emphasized in the review of applications for an Authority to Construct / Permit to Operate. Federal and State air quality regulations also require regions designated as nonattainment to prepare plans that either demonstrate how the region will attain the standard or that demonstrate reasonable improvement in air quality conditions. As noted, the SJVAPCD is responsible for developing attainment plans for the SJVAB for inclusion in California's SIP.

The SJVAPCD's primary means of implementing air quality plans are by adopting and enforcing rules and regulations. Stationary sources within the jurisdiction are regulated by the District's permit authority over such sources and through its review and planning activities. In 200, the SJVAPCD revised its Regulation VIII-Fugitive PM Prohibitions, in response to commitments made in the 1997 PM10 Attainment Plan to incorporate best available control measures (BACM). The revision also includes new rules for open areas and agricultural operations. The provisions of the revised regulation took effect in May 2002. Regulation VIII consists of a series of dust control rules that emphasize reducing fugitive dust as a means of achieving attainment of the federal standards for PM10.

Regulation VIII specifically addresses the following activities:

- Rule 8011: General Requirements;

- Rule 8021: Construction, Demolition, Excavation, Extraction and other Earthmoving Activities;
- Rule 8031: Bulk Materials;
- Rule 8041: Carryout and Trackout;
- Rule 8051: Open Areas;
- Rule 8061: Paved and Unpaved Roads; and
- Rule 8071: Unpaved Vehicle/Equipment Traffic Areas.

Also, SJVAPCD Rule 9510 Indirect Source Review (ISR) was adopted December 15, 2005. ISR was adopted to fulfill the District's emission reduction commitments in the PM10 and Ozone Attainment Plans. ISR requires submittal of an Air Impact Assessment (AIA) application no later than the date on which application is made for a final discretionary approval from the public agency. The AIA will be the information necessary to calculate both construction and operational emissions of a development project. The Project would be likely be required to comply with Rule 9510 since it includes 9,000 square feet of space not identified in Rule 9510, Section 2.0 (Applicability)[2] and would qualify as a "Development Project" under Section 3.13 of Rule 9510. Several sources are exempt from the rule, including transportation projects and transit projects (exempt only from Rule 9510 Section 6.2 and Section 7.1.2), reconstruction projects that result from a natural disaster, and development projects whose primary source of emissions are subject to SJVAPCD Rules 2201 and 2010, which address stationary sources. Any development project that has a mitigated baseline of less than 2 tons per year (tpy) for NO_X and PM10 is also exempted from the mitigation requirements of the rule. Developers are encouraged to reduce as much air pollution as possible through onsite mitigation or the incorporation of air-friendly designs and practices into the project. Some examples include bike paths and sidewalks; traditional street design; medium- to high-density residential developments; locating near bus stops and bike paths; locating near different land use zones, such as commercial; and increasing energy efficiency. If these practices do not completely meet the required reductions (under the rule), new development projects are required to mitigate the remainder of their emissions by contributing to a mitigation fund that would be used to pay for the most cost-effective projects to reduce emissions. Examples include projects to retire or crush polluting cars, replace older diesel engines, and replace gas-powered lawnmowers with electric lawnmowers. Section 6.0 of the Rule outlines general mitigation requirements for developments that include reduction in construction emissions of 20 percent of the total construction NO_X emissions, and 45 percent of the total construction PM10 exhaust emissions. Section 6.0 of the Rule also requires the project to reduce operational NO_X emissions by 33.3 percent and operational PM10 emissions by 50 percent. Section 7.0 of the Rule includes fee schedules for construction or operational excess emissions of NO_X or PM10; those emissions above the goals identified in Section 6.0 of the Rule. Section

[2] The "9,000 square feet of space not identified" is an SJVAPCD Rule 9510 category that captures development projects that do not include the following uses identified in Rule 9510: residential units, commercial space, light industrial space, heavy industrial space, medical office space, general office space, educational space, government space, or recreational space.

7.2 of the Rule identifies fees for excess emissions that are $9,350/ton for NO_X emissions for year 2008 and beyond, and $9,011/ton for PM10 emissions for year 2008 and beyond.

Other SJVAPCD Rules and Regulations that may apply to the project, but not limited to, Rule 4102 (Nuisance), Rule 4641(Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations), Rule 2010 (Permits Required), and Rule 2201 (New and Modified Stationary Source Review).

The SJVAPCD's Governing Board has also adopted the 2018 PM2.5 Plan. This plan highlights a variety of measures designed to achieve all the PM2.5 standards - the 1997 federal standards, the 2006 federal standards, 2012 federal standards, and the State standard - as soon as possible.

Kern County General Plan

The Kern County General Plan Land Use/ Conservation /Open Space Chapter contains the County's Air Quality Element (Kern County Planning Department, 2009). The following policies that would be relevant to the project:

Policy 1.10.2.18: The air quality implications of new discretionary land use proposals shall be considered in approval of major developments. Special emphasis will be placed on minimizing air quality degradation in the desert to enable effective military operations and in the valley region to meet attainment goals.

Policy 1.10.2.19: In considering discretionary projects for which an Environmental Impact Report must be prepared pursuant to the California Environmental Quality Act, the appropriate decision making body, as part of its deliberations, will ensure that:

- All feasible mitigation to reduce significant adverse air quality impacts have been adopted; and
- The benefits of the proposed project outweigh any unavoidable significant adverse effects on air quality found to exist after inclusion of all feasible mitigation. This finding shall be made in a statement of overriding considerations and shall be supported by factual evidence to the extent that such a statement is required pursuant to the California Environmental Quality Act.

Policy 1.10.2.20: The County shall include fugitive dust control measures as a requirement for discretionary projects and as required by the adopted rules and regulations of the San Joaquin Valley Unified Air Pollution Control District and the Kern County Air Pollution Control District on ministerial permits.

Policy 1.10.2.21: The County shall support air districts' efforts to reduce PM10 and PM2.5 emissions.

Policy 1.10.2.22: Kern County shall continue to work with the San Joaquin Valley Unified Air Pollution Control District and the Kern County Air Pollution Control District toward air quality attainment with Federal, State, and local standards.

Policy 1.10.2.23: The County shall continue to implement the local government control measures in coordination with the Kern Council of Governments and the San Joaquin Valley Unified Air Pollution Control District.

3.3.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to air quality. The proposed project would have a significant impact if it would:

1. Conflict with or obstruct implementation of the applicable air quality plan;

2. 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;

3. Expose sensitive receptors to substantial pollutant concentrations; or

4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Criteria Air Pollutants

For construction impacts, the criteria air pollutant of greatest concern to the SJVAPCD is PM10. The SJVAPCD recommends that significance be based on a consideration of the control measures to be implemented during project construction (SJVAPCD 2002; SJVAPCD 2015a). The SJVAPCD *Guide for Assessing and Mitigating Air Quality Impacts* (*GAMAQI*) contains a list of feasible control measures for construction-related PM10 emissions. The SJVAPCD's *GAMAQI* also includes significance criteria for evaluating operational-phase emissions from direct and indirect sources associated with a project. Indirect sources include motor vehicle traffic resulting from the project and do not include stationary sources covered under permit with the SJVAPCD.

For this analysis, the project would be considered to have a significant effect on the environment during short-term construction or long-term operations if it would exceed the following thresholds:

- Cause a net increase in pollutant emissions greater than the San Joaquin Valley Air Pollution Control District's adopted thresholds of significance for criteria pollutant emissions" (SJVAPCD 2015b)
  - 10 tons per year for ROG,
  - 10 tons per year for NO_X,
  - 100 tons per year for CO,
  - 27 tons per year for SO_X,
  - 15 tons per year for PM10, and
  - 15 tons per year for PM2.5

- Cause "visible dust emissions" due to onsite operations and thereby violate SJVAPCD Regulation VIII.[3]

Stationary sources that comply, or that would comply, with SJVAPCD Rules and Regulations are generally not considered to have a significant air quality impact.

Toxic Air Contaminants

The operation of any project with the potential to expose sensitive receptors to substantial levels of TACs would be deemed to have a potentially significant impact. More specifically, proposed development projects that have the potential to expose the public to TACs in excess of the following thresholds would be considered to have a significant air quality impact:

- Probability of contracting cancer for the Maximally Exposed Individual[4] (MEI) exceeds 10 in one million.

- Ground-level concentrations of non-carcinogenic TACs would result in a Hazard Index greater than 1 for the MEI.

Methodology

Construction and operational emissions were calculated by using California Emissions Estimator Model (CalEEMod) version 2016.3.2. CalEEMod is the SJVAPCD-recommended emissions inventory software program that can be used to estimate anticipated emissions associated with land development projects in California. CalEEMod has separate databases for specific counties and air districts. The Kern County – San Joaquin database was used for the proposed project. The model calculates criteria pollutant emissions, including CO, PM10, PM2.5 and the ozone precursors ROG and NOx. On-road mobile source emissions were estimated using the 2017 CARB on-road vehicle emissions factor model (EMFAC) and incorporating the adjustment factors for the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part I: One National Program (SAFE Rule Part I) for light-duty vehicles (i.e., worker vehicles).

As described in the Chapter 2.0, *Project Description*, of this Draft EIR, construction of the proposed project's recharge, recovery and conveyance facilities is anticipated to be built over two phases. Construction would begin with Phase 1 in fall 2021, with the Phase 1 recharge facilities ready to receive water by 2022, subject to variation of the construction schedule. Construction of Phase 2 facilities is anticipated to begin in 2022. Construction of the project will be in multiple sequential or concurrent segments, each ranging from approximately 3 months to 40 months. The project is anticipated to be completed by fall 2026, subject to variations in the construction schedule (see Chapter 2.0, *Project Description*, of this Draft EIR for additional details).

3 Visible dust is defined by the SJVAPCD as "visible dust of such opacity as to obscure an observer's view to a degree equal to or greater than an opacity of 40 percent, for a period or periods aggregating more than three minutes in any one hour."

4 MEI represents the worst-case risk estimate based on a theoretical person continuously exposed for 70 years at the point of highest compound concentration in air.

The input values used in this analysis were adjusted to be project-specific based on construction equipment and construction schedule assumptions developed with the Authority. Haul truck trip and concrete truck trips estimates were based on excavation and required concrete amounts developed with the Authority. Demolition debris haul truck VMT were based on a 20-mile one-way trip based on default calculation methodologies in CalEEMod. As described in Chapter 2.0, *Project Description*, of this Draft EIR, the project's facilities were designed in an effort to balance earthwork onsite, such that all excavated soils are redistributed and utilized to construct the project facilities, requiring no imported materials and leaving no excess materials; therefore it was conservatively assumed that half of the excavated soils during project construction would be balanced locally while the other half would require movement by haul trucks to other portions of the project area where soil haul truck VMT were based on a 4.0 mile one-way trip for the Phase 1 site and a 2.6 mile one-way trip for Phase 2 site (approximately equivalent to the distance from the central areas to the outmost areas of Phase 1 and Phase 2, respectively). Water, vendor and concrete truck trip VMT were based on a 25-mile one-way trip. Worker trip estimates were based on default calculation methodologies in CalEEMod (worker trips equal 16.8 miles).

As described in the Chapter 2.0, *Project Description*, of this Draft EIR, operations of the project would include maintenance activities including weed and pest control and periodic earthwork operations. Weed and pest control operations would be conducted as necessary, which could occur up to four times a year, utilizing products approved for aquatic use in order to protect and preserve groundwater quality. Periodic earthwork operations would be required to maintain levees, enhance soil permeability, and remove vegetative growth. Earthwork would involve disking or scraping the basins to remove the top layer (e.g., one inch) of sediment, approximately once every three years. Operational emissions were modeled for the worse-case year in which four weed and pest control occurrences and all maintenance earthwork could occur within the same year.

For this analysis, the results are expressed in tons per year and are compared with the SJVAPCD and Kern County mass thresholds to determine impact significance. **Appendix C** of this Draft EIR provides detailed emission calculations used in this analysis.

Impact Analysis

Air Quality Plan

Impact 3.3-1: The proposed project would not conflict with or obstruct implementation of the applicable air quality plan. (*Less than Significant Impact*)

If a City or County's General Plan is consistent with the most recently adopted clean air plan, a project that is consistent with the General Plan's land use designation is considered consistent with applicable air quality plans and policies. As stated in Section 3.10, *Land Use and Planning*, the proposed project would be consistent with the Kern County land use designations and zoning for the project area. In addition, the County General Plan is consistent with the applicable air quality plan because data and projections from the General Plans are incorporated into the clean air plans. Development of the proposed project would not interfere with population and long-term vehicle-miles-traveled (VMT) projections used to develop the air quality plan projections as it would not increase the population of the area and operational VMT traveled would

be negligible. Therefore, the proposed project would result in a less-than-significant impact because it would not conflict with the applicable air quality management plan.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Air Quality Standard Violation

Impact 3.3-2: The proposed project could 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 with Mitigation*)

Construction

Construction related emissions arise from a variety of activities including (1) grading, excavation, and other earth moving activities; (2) travel by construction equipment and employee vehicles, especially on unpaved surfaces; (3) and exhaust from construction equipment.

PM10 and PM2.5 emissions from construction would vary greatly from day to day depending on the level of activity, the equipment being operated, silt content of the soil, and the prevailing weather. Larger-diameter dust particles (i.e., greater than 30 microns) generally fall out of the atmosphere within several hundred feet of construction sites, and represent more of a soiling nuisance than a health hazard. Smaller-diameter particles (e.g., PM10 and PM2.5) are associated with adverse health effects and generally remain airborne until removed from the atmosphere by moisture. Therefore, unmitigated construction dust emissions could result in significant local effects. The SJVAPCD recommends that determination of significance with respect to fugitive dust be based upon inclusion of feasible control measures for PM10 and compliance with SJVAPCD Regulation VIII, Rule 8011, of the District's Rules and Regulations.

For all construction projects, implementation of all Regulation VIII fugitive dust control measures are required by law. Implementation of the Regulation VIII fugitive dust control measures and all additional feasible measures would reduce construction PM10 emissions associated with the project to a less-than-significant level, based on the short-term exposure of any single sensitive receptor to residual fugitive dust emissions. The Authority would comply with all applicable SJVAPCD rules and regulations, including Rule 8011 (fugitive dust control measures).

In addition, construction equipment, construction-worker commute vehicles, construction vendor, water, concrete and haul trucks would also generate criteria air pollutant emissions. Criteria pollutant emissions of ROG, NO_X, CO, SO_X from these emissions sources would incrementally add to regional atmospheric loading of ozone precursors during the construction period. In addition, the project would need to comply with SJVAPCD Rule 9510, which would reduce emissions of NO_X and PM10 during project construction. Construction emissions were modeled using CalEEMod, and are depicted below in **Table 3.3-4**.

As depicted in Table 3.3-4, the estimated unmitigated emissions from construction would exceed applicable significance thresholds for NOx. Implementation of **Mitigation Measure AIR-1** would require the project to utilize off-road diesel-powered construction equipment that meet or exceed CARB and USEPA Tier 4 Interim or better off-road emissions standards for equipment rated at 50 horsepower (hp) or greater during project construction (see Mitigation Measures below for additional details). As depicted in **Table 3.3-5**, the estimated mitigated emissions from construction with implementation of Mitigation Measure AIR-1 would not exceed applicable significance thresholds. Additionally, as discussed above, the proposed project may also need to comply with SJVAPCD Rule 9510 (indirect source review), which would further reduce NOx if applicable. No additional mitigation measures would be required.

TABLE 3.3-4
UNMITIGATED PROJECT CONSTRUCTION EMISSIONS (TONS PER YEAR)

		Unmitigated Project Construction Emissions (tons/yr)[a]					
Pollutant	**Significance Thresholds (tons/yr)**	**Year 1 (2021)**	**Year 2 (2022)**	**Year 3 (2023)**	**Year 4 (2024)**	**Year 5 (2025)**	**Year 6 (2026)**
ROG	10	0.38	0.76	1.00	0.61	0.35	0.11
NOx	10	4.91	9.52	**10.78**	6.73	3.86	1.24
CO	100	3.12	6.77	9.29	6.20	3.95	1.32
SOx	27	0.01	0.02	0.03	0.02	0.01	<0.01
PM10[b]	15	0.37	1.12	0.63	0.37	0.21	0.05
PM2.5[b]	15	0.16	0.30	0.41	0.23	0.12	0.03

NOTES:

Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix C of this Draft EIR.

[a] The same thresholds of significance are established by the SJVAPCD and Kern County. **Bold** values are in excess of applicable standard.

[b] Emissions include fugitive dust control measures consistent with SJVAPCD Rule 8011-8081.

SOURCE: ESA 2020.

TABLE 3.3-5
MITIGATED PROJECT CONSTRUCTION EMISSIONS (TONS PER YEAR)

Pollutant	Significance Thresholds (tons/yr)	Mitigated Project Construction Emissions (tons/yr)[a]					
		Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)
ROG	10	0.19	0.39	0.44	0.30	0.21	0.07
NOx	10	3.16	6.70	7.86	5.30	3.47	1.17
CO [c]	100	4.10	9.27	13.05	8.23	5.02	1.65
SOx	27	0.01	0.02	0.03	0.02	0.01	<0.01
PM10[b]	15	0.27	0.82	0.30	0.20	0.13	0.05
PM2.5 [b]	15	0.06	0.12	0.11	0.07	0.05	<0.01

NOTES:

Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix C of this Draft EIR.

[a] The same thresholds of significance are established by the SJVAPCD and Kern County. **Bold** values are in excess of applicable standard.

[b] Emissions include fugitive dust control measures consistent with SJVAPCD Rule 8011-8081.

[c] Mitigated construction CO emissions are higher due to the construction equipment technology required to reduce NOx emissions, which alters the engine combustion process of the off-road construction equipment. However, CO levels would remain well below the significance threshold and no new significant impacts would occur.

SOURCE: ESA 2020.

Operations

Operations of the project would include maintenance activities including weed and pest control and periodic earthwork operations. Weed and pest control operations would be conducted as necessary, which could occur up to four times a year and periodic earthwork operations would be required approximately once every three years. Over the long-term, the project would result in an increase in emissions primarily due to project maintenance activities including weed and pest control activities and triennial earthwork activities. Operational emissions were modeled for the worse-case year in which four weed and pest control occurrences and all maintenance earthwork could occur within the same year. Weed and pest control operations would occur for a duration of 20 days and require a backhoe, a tractor, a water truck and a spray rig for each occurrence. Earthwork activities would occur for a duration of 90 days and would include the operation of a grader, loader, and tractor. Project construction would continue until fall of 2026, with the project being fully operational in fall of 2026. Therefore, emissions presented for year 2026 in **Table 3.3-6** reflect the emissions from the durations of project construction and subsequent operations occurring for that year with and without the incorporation of Mitigation Measure AIR-1. **Table 3.3-7** presents emissions for the first full year of project operations in 2027. Notably, for the typical year, operations would consist of only weed and pest control operations and the associated emissions would be substantially less than those presented in Table 3.3-7.

As depicted in Table 3.3-6 and 3.3-7, the estimated emissions from construction and operations in year 2026 and operations in year 2027 would not exceed the applicable significance thresholds. However, as discussed above, the Authority would still need to comply with all applicable SJVAPCD rules and regulations. No additional mitigation measures would be required.

TABLE 3.3-6
PROJECT CONSTRUCTION + OPERATIONAL EMISSIONS (TONS PER YEAR)

Pollutant	Significance Thresholds (tons/yr)	Unmitigated Project Construction + Unmitigated Operations Emissions (tons/yr)[a]	Mitigated Project Construction + Unmitigated Operations Emissions (tons/yr)[a]
		Year 2026	Year 2026
ROG	10	0.27	0.23
NOx	10	3.02	2.95
CO	100	2.80	3.13
SOx	27	0.01	0.01
PM10[b]	15	0.43	0.43
PM2.5[b]	15	0.11	0.09

NOTES:

Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix C of this Draft EIR.

[a] The same thresholds of significance are established by the SJVAPCD and Kern County. **Bold** values are in excess of applicable standard.

[b] Emissions include fugitive dust control measures consistent with SJVAPCD Rule 8011-8081.

SOURCE: ESA 2020.

TABLE 3.3-7
PROJECT OPERATIONAL EMISSIONS (TONS PER YEAR)

Pollutant	Significance Thresholds (tons/yr)	Unmitigated Project Operations Emissions (tons/yr)[a]
		Year 2027
ROG	10	0.16
NOx	10	1.78
CO	100	1.47
SOx	27	<0.01
PM10[b]	15	0.38
PM2.5[b]	15	0.08

NOTES:

Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix C of this Draft EIR.

[a] The same thresholds of significance are established by the SJVAPCD and Kern County. **Bold** values are in excess of applicable standard.

[b] Emissions include fugitive dust control measures consistent with SJVAPCD Rule 8011-8081.

SOURCE: ESA 2020.

Cumulative Impacts

According to the SJVAPCD *GAMAQI*, a cumulative impact occurs when two or more individual effects, considered together, are considerable or would compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant impacts, meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. According to the Kern County *Guidelines for Preparing an Air Quality Assessment for Use in Environmental*

Impact Reports, the established thresholds of significance determine whether or not a project would result in individual as well as cumulatively considerable impacts. Thus, any project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact and any project that would individually have a less than significant air quality impact would also be considered to have a less than significant cumulative air quality impact.

Construction emissions from the project would result in the generation of air pollutants in the project area and in the immediate vicinity, and would incrementally add to cumulative emissions. The project would also add to ozone precursor emissions on a regional basis and would incrementally add to PM10, PM2.5 and CO emissions on a local basis. For operations, on-road traffic would be minimal and would result in a negligible increase in criteria pollutant emissions. Weed and pest control and triennial earthwork operations would also result in minor increases in criteria pollutant emissions. As described above, short-term project construction and long-term project operations would result in a less-than-significant individual project impact with implementation of Mitigation Measure AIR-1. The project would not result in cumulatively considerable increases of criteria air pollutants.

Mitigation Measures

AIR-1: The Authority shall require the construction contractor to implement construction equipment features for equipment operating at the project site. These features shall be included in applicable bid documents and successful contractor(s) must demonstrate the ability to supply such equipment. Construction features will include the following: The proposed project shall utilize off-road diesel-powered construction equipment that meet or exceed CARB and USEPA Tier 4 Interim or better off-road emissions standards for equipment rated at 50 horsepower (hp) or greater during project construction. Such equipment will be outfitted with BACT devices including a CARB certified Level 3 Diesel Particulate Filter or equivalent.

Alternatively, instead of utilizing Tier 4 equipment, the construction contractor shall revise the project construction phasing and timing of equipment usage and demonstrate that implementation of the project construction schedule would not exceed the San Joaquin Valley Air Pollution Control District threshold for NOx emissions (currently 10 tons/year).

Significance Determination

Less than Significant Impact with Mitigation

Sensitive Receptor Exposure

Impact 3.3-3: The proposed project would not expose sensitive receptors to substantial pollutant concentrations. (*Less than Significant Impact*)

Toxic Air Contaminants

Construction of the proposed project would result in short-term diesel exhaust emissions (DPM), which are TACs, from on-site heavy-duty equipment. Project construction would generate DPM emissions from the use of off-road diesel equipment required for site grading and excavation, and other construction activities, as well as from the use of on-road heavy duty trucks. The dose to which sensitive receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project. Thus, the duration of the proposed construction activities (approximately 5 years) would only constitute approximately 7 percent of the total 70-year exposure period. In addition, while construction activities may at times occur near air quality-sensitive receptors (i.e., 50 feet to 1,000 feet from sensitive receptors), given the size of the Phase 1 and Phase 2 areas of approximately 640 acres each, the majority of project construction activity would occur at a substantial distance from any one specific sensitive receptor location (i.e., more than 1,000 feet away) for most of the construction duration. The distribution of construction over a large area would disperse pollutants generated by construction activity as construction moves from one location to another within the Phase 1 and Phase 2 areas such that any one specific sensitive receptor location would not be exposed to prolonged periods of construction activity and would not be exposed to substantial pollutant concentrations.

The project would also utilize a construction contractor(s) that complies with required and applicable BACT and the In-Use Off-Road Diesel Vehicle Regulation that would minimize diesel particulate matter emissions from construction activities. Furthermore, compliance with the CARB anti-idling Air Toxics Control Measure, which limits idling to no more than five minutes at any location for diesel-fueled commercial vehicles, would further minimize diesel particulate matter emissions in the construction area. Because the use of mobilized equipment would be temporary and because construction activity would move from one location to another within the Phase 1 and Phase 2 areas such that any one specific sensitive receptor location would not be exposed to prolonged periods of construction activity, DPM from construction activities would not be anticipated to result in the exposure of sensitive receptors to levels that exceed applicable standards.

The long-term operation of the project would result in minimal TAC emissions associated with routine maintenance operations including weed and pest control and triennial earthwork activities. Earthwork would involve disking or scraping the basins to remove the top layer (e.g.,

one inch) of sediment, approximately once every three years for a maximum of 90 days per year. Typical year operations would consist of only on-road trips for periodic inspection and minor maintenance. As a result, exposure of sensitive receptors to substantial toxic air emissions from the project would be less-than-significant.

Valley Fever

The proposed project has the potential to generate fugitive dust containing Valley Fever spores (*Coccidioides immitis* fungus) that could then reach nearby sensitive receptors during construction. The Kern County Public Health Services Department (Public Health Services Department) found that *Coccidioides immitis* frequently occurs in the soil in the following areas (Kern County 2020):

- Sites with many animal burrows
- Old (prehistoric) Native American campsites
- Areas with sparse vegetation
- Areas adjacent to arroyos
- Packrat middens
- Upper 12 inches of undisturbed soil
- Sandy well aerated soil with high water-holding capacity

Additionally, the Public Health Services Department indicated that Valley Fever is not likely to be found in the following areas (Kern County 2020):

- Cultivated fields
- Heavily vegetated areas
- Higher elevations (above about 7,000 feet)
- Areas where commercial fertilizers have been applied
- Paved or oiled areas
- Heavily urbanized areas where there is relatively little undisturbed soil

The majority of the project area consists of cultivated fields, canals and ditches, recharge ponds, and paved roadways, which have a low likelihood of containing Valley Fever spores due to the past soil disturbance and turnover. As a result, the proposed project would not be anticipated to expose nearby sensitive receptors to active Valley Fever spores.

Furthermore, as described above, the project would be required to implement SJVAPCD Rule 8011, fugitive dust control measures. In addition, the proposed project would be required to comply with SJVAPCD Rule 8021 Section 6.3, which requires applicants to develop, prepare, submit, obtain approval of, and implement a Dust Control Plan, which would reduce fugitive dust emission impacts to less than significant for all construction phases of the project, which would also control the release of the *Coccidioides immitis* fungus from construction activities. Controlled construction practices to prevent fugitive dust make the spreading of Valley Fever to nearby sensitive receptors and surrounding communities unlikely.

Long-term operation of the proposed project would result in minimal fugitive dust emissions associated with routine maintenance operations including weed and pest control and triennial earthwork activities. Earthwork would involve disking or scraping the basins to remove the top layer (e.g., one inch) of sediment, approximately once every three years for a maximum of 90 days per year. Typical year operations would consist of only on-road trips for periodic inspection and minor maintenance. The proposed facilities associated with the proposed project include the same kinds of water recharge, recovery and conveyance facility operations occurring under existing conditions in the project area. Therefore, the potential for the proposed project to result in an increase in the exposure of nearby sensitive receptors and onsite workers to Valley Fever spores at a greater level than in the existing condition would not be anticipated. Impacts would be less than significant.

Carbon Monoxide (CO) Hotspots

CO is a localized pollutant of concern. However, since construction activities (anticipated to last approximately 5 years) would only constitute approximately 7 percent of the total 70-year exposure period described above. In addition, the majority of project construction activity would occur at a substantial distance from sensitive receptors, and because the use of mobilized equipment, worker and truck vehicles would be temporary and there are no sensitive receptors located immediately adjacent to areas where construction would occur for prolonged periods, construction would not emit CO in quantities that could pose health concerns. Also, due to the existing low concentrations of CO in the area that are projected to further decline in the future[5], project operations would not result in or contribute substantially to an air quality. Long-term operations would result in minimal CO emissions associated with routine weed and pest control and triennial earthwork activities. Thus, operational emissions of CO would not result in or contribute substantially to an air quality violation. The short-term construction and long-term operational mobile-source impact of the project on CO concentrations would be less-than-significant and no mitigation is required.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Odors

Impact 3.3-4: The proposed project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. (*Less than Significant Impact*)

Types of land uses that typically pose potential odor problems include agriculture, wastewater treatment plants, food processing and rendering facilities, chemical plants, composting facilities, landfills, waste transfer stations, and dairies. In addition, the occurrence and severity of odor impacts

5 See air quality setting information above that discusses the current success statewide in reducing CO levels.

depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. Although offensive odors rarely cause any physical harm, they can still be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies.

The proposed project does not include any of the above-mentioned land use activities, with the exception of agriculture. However, agricultural land uses are part of the baseline conditions for the project area and surrounding area. Therefore, the proposed project would not change baseline conditions to introduce new land uses that would create objectionable odors. Occasionally, diesel exhaust from heavy equipment used during construction activities or during operational maintenance activities can generate objectionable odors, but these dissipate very quickly. Thus, neither construction nor the operation of the project would create objectionable odors affecting a substantial number of people, and odor impacts would be less-than-significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

General Conformity Determination

Under Section 176(c)(1) of the federal CAA, federal agencies that "engage in, support in any way or provide financial assistance for, license or permit, or approve any activity"[6] must demonstrate that such actions do not interfere with state and local plans to bring an area into attainment with the NAAQS. Kern County is designated extreme non-attainment for the federal 8-hour ozone NAAQS, attainment-maintenance for the federal CO and PM10 standards, and non-attainment serious for federal PM2.5 standards. The program by which a federal agency determines that its action would not obstruct or conflict with air quality attainment plans is called "General Conformity." The implementing regulations for General Conformity are found in 40 CFR 93(B).[7]

Under the General Conformity regulations, both the direct and indirect emissions associated with a federal action must be evaluated. Direct emissions are defined as:

> *Those emissions of a criteria pollutant or its precursors that are caused or initiated by the federal action and originate in a nonattainment or maintenance area and occur at the same time and place as the action and are reasonably foreseeable.*[8]

Indirect emissions are defined as:

> *Those emissions of a criteria pollutant or its precursors:*

6 42 USC 7506(c).
7 General conformity regulations were amended effective July 6, 2010. (75 FR 17254 (April 5, 2010)).
8 40 CFR 93.152 (as revised April 5, 2010, effective July 6, 2010; 75 FR 17273).

> *1. That are caused or initiated by the federal action and originate in the same nonattainment or maintenance area, but occur at a different time or place as the action;*
>
> *2. That are reasonably foreseeable;*
>
> *3. That the agency can practically control; and*
>
> *4. For which the agency has continuing program responsibility.*[9]

For purposes of this definition, even if a federal licensing, rulemaking, or other approving action is a required initial step for a subsequent activity that causes emissions, such initial steps do not mean that a federal agency can practically control any resulting emissions.[10]

When describing the 2010 revisions to the definition of indirect emissions, USEPA offered the following explanation:

> *EPA is revising the definition for indirect emissions to clarify that only indirect emissions originating in a nonattainment or maintenance area need to be analyzed for conformity with the applicable SIP. In addition, EPA is revising the definition of "indirect emissions" to clarify what is meant by "the agency can practically control" and "for which the agency has continuing program responsibility."*

This clarification represents USEPA's long standing position that Congress did not intend for conformity to apply to "cases where although licensing or approving action is a required initial step for a subsequent activity that causes emissions, the agency has no control over that subsequent activity, either because there is no continuing program responsibility or ability to practically control."[11]

The General Conformity regulations incorporate a stepwise process, beginning with an applicability analysis. According to USEPA guidance,[12] before any approval is given for a federal action to go forward, the regulating federal agency must apply the applicability requirements found at 40 CFR 93.153(b) to the federal action to evaluate whether, on a pollutant-by-pollutant basis, a determination of General Conformity is required. The guidance states that the applicability analysis can be (but is not required to be) completed concurrently with the NEPA analysis. If the regulating federal agency determines that the General Conformity regulations do not apply to the federal action, no further analysis or documentation is required. If the General Conformity regulations do apply to the federal action, the regulating federal agency must next conduct a conformity evaluation in accordance with the criteria and procedures in the implementing regulations, publish a draft determination of General Conformity for public review, and then publish the final determination of General Conformity.

A conformity determination is required for each criteria pollutant or precursor where the total of direct emissions of the criteria pollutant or precursor in a federal non-attainment or maintenance area would equal or exceed specified annual emission rates, referred to as "de minimis"

9 40 CFR 93.152 (as revised April 5, 2010, effective July 6, 2010; 75 FR 17273).
10 40 CFR 93.152 (as revised April 5, 2010, effective July 6, 2010; 75 FR 17273).
11 75 FR 17260 (April 5, 2010).
12 USEPA 1994.

thresholds." These de minimis thresholds are provided in 40 CFR 93.153(b)(1) and (2). For ozone precursor emissions, the de minimis thresholds depend on the severity of the non-attainment classification. In an extreme ozone non-attainment area, the de minimis thresholds are 10 tons per year for both NO_X and VOC (or ROG see subsection 3.3.1 for additional details). In a federal ozone attainment maintenance area, the de minimis thresholds are 100 tons per year for both CO and PM10. In a federal serious non-attainment area, the de minimis threshold is 70 tons per year for PM2.5. As presented above in Table 3.3-3, the USEPA classified the San Jaoquin Valley to extreme nonattainment in the Federal Register on May 5, 2010. The San Joaquin Valley is also attainment-maintenance for the federal CO and PM10 standards and serious non-attainment for the federal PM2.5 standards. Thus, based on the present attainment status of the San Joaquin Valley, a federal action would conform to the SIP if its annual emissions remain below 10 tons of VOC or NO_X, 100 tons of CO or PM10, and 70 tons of PM2.5. PM2.5 annual emissions include direct emissions, NO_X and VOC per *de minimis* guidelines.

The General Conformity regulations require that a General Conformity determination analyze the following emissions scenarios: (1) the attainment year specified in the SIP, or if the SIP does not specify an attainment year, the latest attainment year possible under the Act; or (2) the last year for which emissions are projected in the maintenance plan; (3) the year during which the total of direct and indirect emissions from the action is expected to be the greatest on an annual basis; and (4) any year for which the applicable SIP specifies an emissions budget (40 CFR 93.159(d), as amended, effective July 6, 2010).

For informational purposes, the year during which emissions are the greatest (2023) and all other construction years (2021-2022, 2024-2026) are analyzed under the *de minimis* thresholds. Construction and operational emissions during year 2026 and operational emissions for the first full year of project operations in year 2027 were also considered. The emissions from off-road are calculated based using Tier 4 Interim engines equipment rated at 50 hp or greater during project construction as required by Mitigation Measure Air-1 to address Impact 3.3-2. As discussed previously, the construction contractor would ensure that the on-site diesel equipment fleet meets the applicable emission standards.

Annual emissions for the project with required mitigation measures were compared to the General Conformity *de minimis* levels for NAAQS non-attainment areas (see **Table 3.3-8**). Annual construction emissions of VOC, CO, NO_X, PM10, and PM2.5 would be below applicable General Conformity thresholds and thus in conformance with the SIPs. Additionally, short-term direct construction emissions associated with the project would not conflict with or obstruct implementation of applicable long-term air quality management plans. Therefore, no further conformity analysis is required for any of the pollutants because their emissions would be less than the conformity thresholds, and no significant adverse effect from the project would occur.

TABLE 3.3-8
GENERAL CONFORMITY ANALYSIS – SUMMARY OF PROJECT CONSTRUCTION AND OPERATIONS EMISSIONS BY YEAR (2021-2027) (TONS PER YEAR)

		Project Emissions (tons/yr)[a]						
Pollutant	De Minimis Thresholds (tons/yr)	Construction - Year 1 (2021)	Construction - Year 2 (2022)	Construction - Year 3 (2023)	Construction - Year 4 (2024)	Construction - Year 5 (2025)	Construction and Operations - Year 6 (2026)	Operations - Year 7 (2027)
VOC	10	0.19	0.39	0.44	0.30	0.21	0.23	0.16
NOx	10	3.16	6.70	7.86	5.30	3.47	2.95	1.78
CO	100	4.10	9.27	13.05	8.23	5.02	3.13	1.47
PM10[b]	100	0.27	0.82	0.30	0.20	0.13	0.43	0.38
PM2.5[b]	70	0.06	0.12	0.11	0.07	0.05	0.09	0.08

SOURCE: ESA 2020.

3.3.4 References

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3.4 Biological Resources

This section addresses the potential impacts of the proposed project on biological resources. The section includes a description of the environmental setting to establish baseline conditions for biological resources; a summary of the regulations related to biological resources; and an evaluation of the proposed project's potential effects on biological resources, including cumulative impacts. This analysis is supported by the *Biological Resources Technical Report for the Kern Fan Groundwater Storage Project* (ESA 2020), included as **Appendix D**. The Biological Resources Technical Report (BRTR) includes a literature review, reconnaissance level survey (reconnaissance), and desktop analysis of the Phase 1, Phase 2, Kern Fan Conveyance Facilities project areas, collectively referred to as the "project areas," to identify special-status plant and wildlife species, vegetation communities and sensitive natural communities, and to analyze potential wetlands and waters of the United States (U.S.) that may potentially occur.

3.4.1 Environmental Setting

Methodology

The setting and analysis of biological resources is based on information from resource agencies, reconnaissance field surveys of the project area, and review of available literature and data as listed below.

- California Department of Fish and Wildlife (CDFW). 2020. California Natural Diversity Data Base (CNDDB) (Accessed July 2020). Database was queried for special status species records within the Stevens United States Geological Survey (USGS) topographic quadrangle and surrounding eight quadrangles. These eight quadrangles include: East Elk Hills, Tupman, Rosedale, Millux, Mouth of Kern, Taft, and Buttonwillow.
- California Native Plant Society (CNPS accessed July 2020). 2020. Inventory of Rare and Endangered Vascular Plants of California. Database was queried for special status species records within the Stevens USGS topographic quadrangle and surrounding eight quadrangles. These eight quadrangles include: East Elk Hills, Tupman, Rosedale, Millux, Mouth of Kern, Taft, and Buttonwillow.
- Historical aerial imagery. (Google Earth Pro 2020).
- United States Department of Agriculture (USDA) Soil Survey Geographic Data Base.
- *Biological Technical Report for the Stockdale Integrated Banking Project* (ESA 2013).
- *Final Environmental Impact Report for the Stockdale Integrated Banking Project* (ESA 2014)
- *Technical Memorandum for Ecosystem Benefits from Kern Fan Groundwater Storage Project* (Cramer Fish Sciences 2017).
- *Metropolitan Bakersfield Habitat Conservation Plan* (City of Bakersfield and Kern County 2002)
- *Biological Resources Technical Report for the Kern Fan Groundwater Storage Project* (ESA 2020); Included with this EIR as Appendix D.

Regional Setting

The project areas are located in the San Joaquin Valley and in Kern County near the city of Bakersfield and the communities of Buttonwillow and Tupman. These areas are also located within the California Floristic Province (CA-FP), Great Central Valley (GV) Region, San Joaquin Valley (SnJV) Subregion (Hickman 1993). The CA-FP is the largest geographic unit in California and comprises much of the state west of the dry regions of the Great Basin (GB) and Desert (D) Provinces in northern and southern California (Hickman 1993). The GV Region is entirely contained within the CA-FP, is roughly the same area as the California Central Valley and was once comprised of grassland (California prairie), marshes, extensive riparian woodlands, and islands of valley-oak savanna, but is now predominantly agricultural (Hickman 1993). The GV Region is divided into two subregions: the Sacramento Valley (ScV) Subregion to the north and the SnJV Subregion to the south (Hickman 1993). The SnJV Subregion is the larger subregion and is hotter and drier than the ScV Subregion with desert elements in the south (Hickman, 1993). Land use within the vicinity of the proposed project is primarily agriculture.

The climate of the proposed project is characterized by hot, dry summers with daytime temperatures frequently above 100 degrees Fahrenheit (NOAA 2020). The winter months are cool and foggy with temperatures seldom below freezing and, on average, there are between 250 and 300 frost-free days per year. Average rainfall is less than 10 inches per year with the heaviest rains occurring between January and March (NOAA 2020).

Local Setting

Phase 1 Project Area

The Phase 1 project area consists of non-native grassland, agriculture fields, recharge basins, and areas where residential and business development has occurred. The recharge basins that currently exist within the Phase 1 project area consist of a mix of non-native and native vegetation species such as Russian thistle (*Kali tragus*, non-native), shortpod mustard (*Hirschfeldia incana*, non-native), annual burrweed (*Ambrosia acanthicarpa*, native), horseweed (*Erigeron canadensis*, native), and allscale saltbush (*Atriplex polycarpa*, native). The recharge basins are also intentionally planted with safflower (*Carthamus tinctorius*) and rye (*Secale cereal*) as "cover."

The recharge basins within the Phase 1 project area are separated by elevated roads with culverts installed underneath each road, allowing water to flow between the basins. Adjacent lands north and west of the property are comprised mainly of agricultural fields. The area east of the Phase 1 project area consists of residential neighborhoods, while the area to the south is owned by the Kern Water Bank (south of Stockdale Highway).

Phase 2 Project Area

The entire Phase 2 project area is used for agriculture, supporting crops such as alfalfa (*Medicago sativa*), cotton (*Gossypium* sp.), potato (*Solanum tuberosum*), grape (*Vitis* sp.), and pistachio (*Pistacia* sp.). Several small structures and open storage areas comprised of bare ground have been developed for the operation and maintenance of the fields. One residential house and buildings associated with surrounding agricultural land uses occur to the south of the project area,

along Stockdale Highway. The soft-bottomed East Side Canal directly abuts the eastern boundary and is regularly used to irrigate the nearby agricultural fields and orchards. The land south, north, east, and west of the Phase 2 project area is currently used for agricultural purposes.

Kern Fan Conveyance Facilities Project Area

The Kern Fan Conveyance Facilities project area consists of numerous vegetation communities; including but not limited to bush seepweed scrub, quailbrush scrub, smartweed-cocklebur patches, and spinescale scrub. Active agriculture lands exist on the western and northern portions of the project area. Interstate 5 intersects diagonally through the project area and is the east-west boundary that separates the project area from the Phase 2 project area. Detailed descriptions of vegetation communities are described below.

The Tule Elk State Reserve is located within a section of the western and southern portion of the project area. The Tule Elk State Reserve protects a small herd of tule elk (*Cervus canadensis nannodes*), which were once in danger of extinction in California. Some vegetation communities on the Tule Elk State Preserve include non-native grassland, annual grassland, and cattail marsh.

The Kern Water Bank is located on the eastern and southern portion of the project area. Developed recharge basins were observed within this section of the site, as well as an access road that runs along the chain-link fence that separates from the Tule Elk State Reserve.

The northern portion of the project area consists of mainly active agriculture lands interspersed with native vegetation communities such as bush seepweed scrub, annual grassland, allscale scrub, and quailbrush scrub. Additionally, a small area of urban development (gas station and other buildings), is located approximately in the central portion of the site.

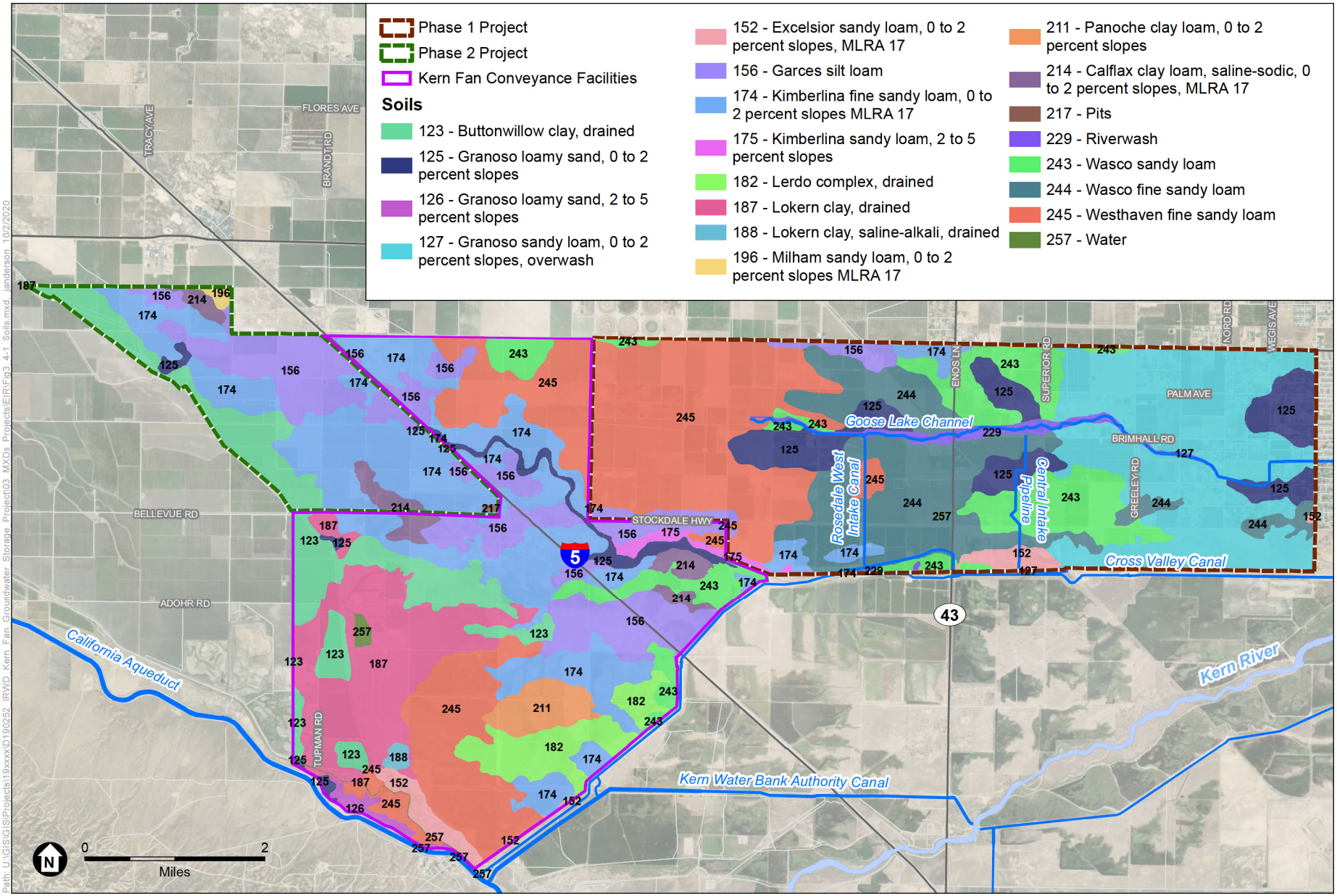
Two potential jurisdictional features are located in the project area, the East Side Canal and the Outlet Canal.

Soils and Topography

In general, the topography of the project areas is flat at approximately 310 feet above mean sea level (amsl). Soils on the project area are deep to very deep, well drained, with slow to moderately rapid permeability (NRCS 2020). Descriptions of the 19 soil types found within the project areas are discussed below and depicted on **Figure 3.4-1**.

Buttonwillow clay, drained

The Buttonwillow clay, drained soil consists of deep, somewhat poorly drained soils formed in alluvium weathered mainly from granite. Buttonwillow soils are in basins and have slopes of 0 to 2 percent. The mean annual precipitation is approximately 5 inches and the mean annual temperature is 63 degrees F.



SOURCE: ESRI; Kern County; USDA, 2020

Kern Fan Groundwater Storage Project

Figure 3.4-1

Soils

ESA

Granoso loamy sand, 0 to 2 percent slopes and Granoso loamy sand, 0 to 2 percent slopes, overwash, Granoso loamy sand, 2 to 5 percent slopes

The Granoso series consists of very deep, somewhat excessively drained soils that formed in alluvium derived from rocks of mixed mineralogy. The Granoso soils are on alluvial fans and flood plains and have slopes of 0 to 5 percent. The average annual precipitation is approximately 6 inches and the mean annual temperature is about approximately 64 degrees F.

Excelsior sandy loam, 0 to 2 percent slopes, MLRA 17

The Excelsior series consists of very deep, well drained soils on alluvial fans, bars and channels on flood plains. These soils are formed in mixed alluvium dominantly from igneous and calcareous sedimentary rocks. The slope is 0 to 2 percent, mean annual temperature is approximately 63 degrees F. and the mean annual precipitation is approximately 7 inches.

Garces silt loam

The Garces series consists of very deep, well drained saline-sodic soils that formed in granitic alluvium. Garces soils are on alluvial fans, terraces, and basin rims and have slopes of 0 to 2 percent. The mean annual precipitation is approximately 6 inches and the mean annual temperature is approximately 64 degrees F.

Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 and Kimberlina sandy loam, 2 to 5 percent slopes

The Kimberlina series consists of very deep, well drained soils on flood plains and recent alluvial fans. These soils are formed in mixed alluvium derived dominantly from igneous and/or sedimentary rock sources. The slope is 0 to 9 percent, mean annual precipitation is approximately 6 inches and the mean annual temperature is approximately about 64 degrees F.

Lerdo complex, drained

The Lerdo series consists of deep, somewhat poorly drained soils formed in granitic or sedimentary alluvium. Lerdo soils are located on alluvial plains and saline-alkali basins and have slopes of 0 to 2 percent. The mean annual precipitation is approximately 5 inches and the mean annual temperature is approximately 64 degrees F.

Lokern clay, drained, Lokern clay, saline-alkali drained

The Lokern series consists of deep, somewhat poorly drained clayey soils formed from mixed but predominantly granitic alluvium. Lokern soils are located on basins and have slopes of 0 to 2 percent. The mean annual precipitation is approximately 5 inches and the mean annual temperature is approximately 63 degrees F.

Milham sandy loam, 0 to 2 percent slopes MLRA 17

The Milham series consists of very deep, well drained soils on alluvial fans, plains, low terraces and fan remnants. These soils formed in mixed calcareous alluvium weathered from granitic and sedimentary rock. The slope is 0 to 9 percent, average annual precipitation is approximately 7 inches and the mean annual temperature is approximately 64 degrees F.

Panoche clay loam, 0 to 2 percent slopes

The Panoche series consists of very deep, well drained soils on alluvial fans and flood plains. These soils formed in loamy calcareous alluvium from sedimentary rock and slope is 0 to 15 percent. The mean annual precipitation is approximately 6 inches and the mean annual temperature is approximately 63 degrees F.

Calflax clay loam, saline-sodic, 0 to 2 percent slopes, MLRA 17

The Calflax series consists of very deep, moderately well drained soils on fan skirts These soils are formed in alluvium derived from calcareous sedimentary rock. The slope is 0 to 2 percent, mean. The mean annual precipitation is about 7 inches and the mean annual temperature is about 63 degrees F.

Pits

These soils consist of areas that have been excavated for sand or gravel. The areas are mostly on broad outwash plains and terraces of stream valleys and generally range from 3 to 30 acres. These areas have sparse vegetation consisting of drought-resistant plants. Slopes range mostly from 0 to 25 percent and steep escarpments are along the edges of the pits.

Riverwash

This soil is found on barren alluvial areas, usually coarse-textured, exposed along streams at low water and subject to shifting during normal high water.

Wasco sandy loam and Wasco fine sandy loam

The Wasco series consists of very deep, well drained soils on recent alluvial fans and flood plains. These soils formed in mixed alluvium derived mainly from igneous and/or sedimentary rock sources. The slope is 0 to 5 percent slopes, mean annual precipitation is approximately 6 inches and the mean annual temperature is approximately 64 degrees F.

Westhaven fine sandy loam

The Westhaven series consists of very deep, well drained soils that formed in stratified mixed alluvium weathered from sedimentary and/or igneous rocks. Westhaven soils are on alluvial fans and flood plains. The slope is 0 to 5 percent, mean approximately precipitation is about 7 inches and the mean annual temperature is approximately 64 degrees F.

Biological Resource Reconnaissance

Reconnaissance was conducted by ESA senior biologists Travis Marella and Karl Fairchild on July 6 and 7, 2020. Weather conditions at the time of the reconnaissance consisted of

temperatures averaging 100 degrees Fahrenheit (ºF), clear skies and wind speeds ranging from zero to five miles per hour (mph). The purpose of the reconnaissance was to identify, map and characterize natural resources present or with potential to occur on and adjacent to the project areas.

The Phase 1 and Phase 2 project areas were surveyed by foot and by vehicle to determine if the areas and immediately adjacent areas have the potential to support any special-status plant or wildlife species, or sensitive natural communities. The surveys of the Phase 1 and Phase 2 project areas were mainly conducted by driving around the perimeter on access roads and surveying as much of the interior areas as possible using 10x42 binoculars. Key locations (e.g., Tule Elk State Reserve) with possible sensitive resources were visited in the Conveyance Facilities project area.

The Phase 1 and Phase 2 project areas were surveyed with a 500-foot buffer to assess the adjacent areas where special-status species and sensitive natural communities could potentially occur. All incidental observations of flora and fauna, including sign of wildlife presence (e.g., scat, tracks, burrows, vocalizations) were noted during the assessment. Photos within each project area were taken and are provided in the BRTR (see Appendix D).

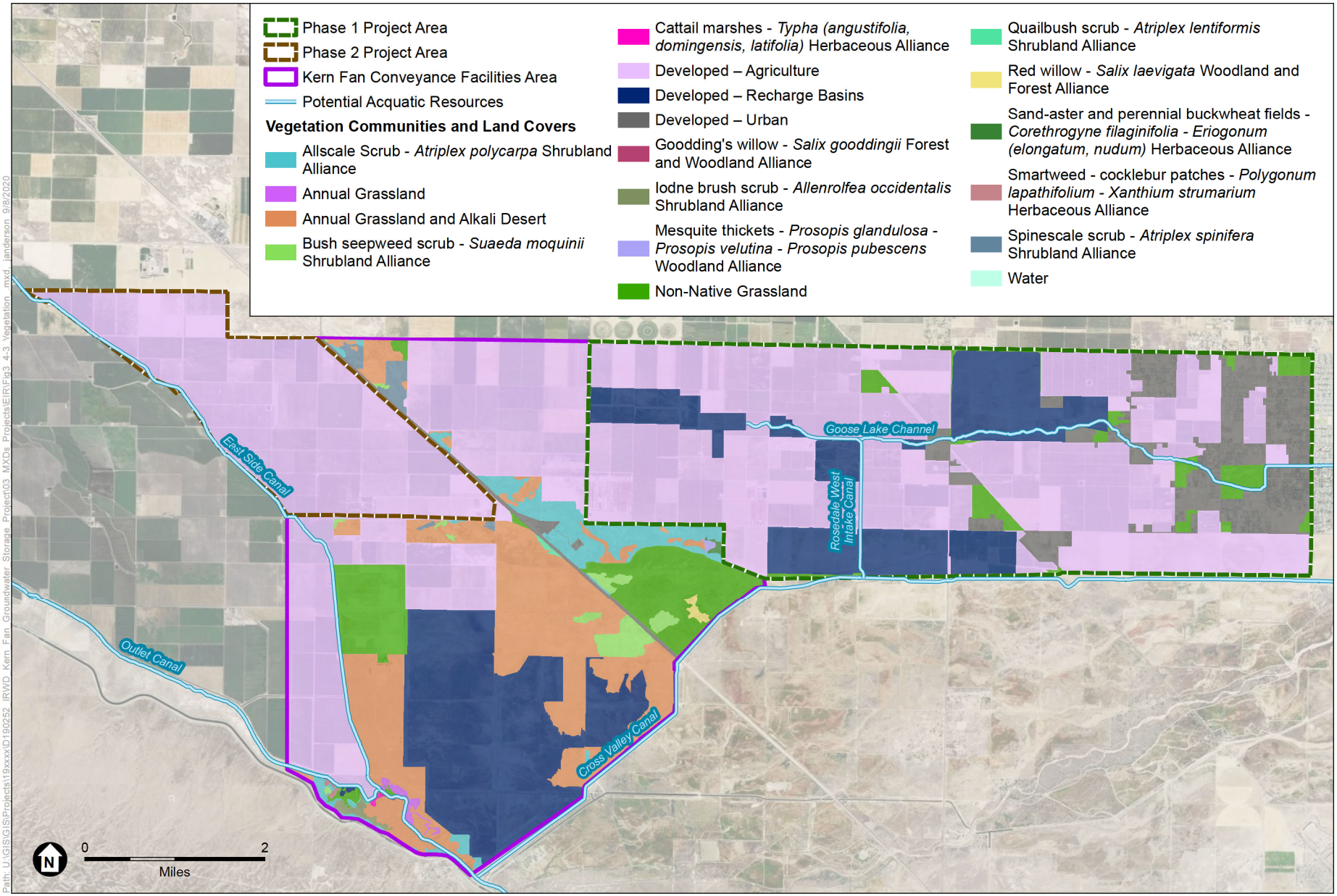
Vegetation Communities and Land Cover Types

All vegetation communities and land cover types were characterized and delineated on aerial photographs during the field survey, and then digitized on aerial maps using a Geographic Information System software (ArcGIS). The nomenclature used to describe the vegetation is based on *A Manual of California Vegetation*, Second Edition (Sawyer 2009), or characterized based on species dominance when not recognized in the *Manual*. Vegetation communities and land cover types located on the project areas are described in detail below and are depicted on **Figure 3.4-2.** It should be noted that the majority of the Conveyance Facilities project area is located on private property and biologists were unable to access to map vegetation communities and land cover types. The entire Conveyance Facilities project area was previously mapped and provided on a dataset by the Geographical Information Center at California State University, Chico (CSU Chico 2018). The entirety of these communities cannot be described at this time, as access was not allowed; however, the vegetation community classification locations and acreages are listed below.

Vegetation Communities

Non-Native Grassland

This vegetation community was characterized and mapped in several areas within the Phase 1 project area and within the eastern and western areas of the Conveyance Facilities project area. The areas adjacent to this community are comprised of private residences, recharge basins, roadways, agricultural fields and saltscale scrub. Species observed within this community included Russian thistle and shortpod mustard. This vegetation community consists of approximately 1,756756 acres.



SOURCE: ESRI; Kern County; CDFW; ESA.

Kern Fan Groundwater Storage Project

Figure 3.4-2

Vegetation Communities and Land Covers

ESA

Annual Grassland – Alkali Desert Scrub

This vegetation community is located in numerous areas, mainly in central and western portions of the Conveyance Facilities project area, and comprises collectively approximately 2,77171 acres.

Annual Grassland Scrub

This vegetation community is located in the southern portion of the Conveyance Facilities project area and comprises collectively approximately 4444 acres.

Allscale Scrub - *Atriplex polycarpa* Shrubland Alliance

This vegetation community is located almost exclusively in the central portion of the Conveyance Facilities project area and comprises collectively approximately 6622 acres.

Spinescale scrub - Atriplex spinifera Shrubland Alliance

This vegetation community is located almost exclusively in the northern portion of the Conveyance Facilities project area and comprises collectively approximately 115 acres. Additionally, several small patches are located in the middle portion of the Conveyance Facilities project area.

Iodine brush scrub - *Allenrolfea occidentalis* Shrubland Alliance

This vegetation community is located in the southeastern portion of the Conveyance Facilities project area and comprises collectively approximately 39 acres. This community is considered sensitive with a State ranking of S3.2.

Sand-aster and perennial buckwheat fields - *Corethrogyne filaginifolia - Eriogonum (elongatum, nudum*) Herbaceous Alliance

This vegetation community is located within the northern portion of the Conveyance Facilities project area and comprises collectively approximately 1010 acres.

Bush seepweed scrub - *Suaeda moquinii* Shrubland Alliance

This vegetation community is located primarily within the eastern portion of the Conveyance Facilities project area, with a couple small patches located in the northern portion. This community comprises collectively approximately 220 acres and is considered sensitive with a State ranking of S3.

Smartweed - cocklebur patches - *Polygonum lapathifolium - Xanthium strumarium* Herbaceous Alliance

This vegetation community is located within the southwestern portion of the Conveyance Facilities project area and comprises collectively approximately 8 acres.

Quailbush scrub - *Atriplex lentiformis* Shrubland Alliance

This vegetation community is located within the northern portion of the Conveyance Facilities project area and comprises collectively approximately 1515 acres.

Goodding's willow - *Salix gooddingii* Forest & Woodland Alliance

This vegetation community is located within southwestern portion of the Conveyance Facilities project area and comprises collectively approximately 7 acres. This community is considered sensitive with a State ranking of S3.

Red willow - *Salix laevigata* Woodland and Forest Alliance

This vegetation community is located in a small area of the western portion of the Conveyance Facilities project area and comprises collectively approximately 23 acres. This community is considered sensitive with a State ranking of S3.

Cattail marshes - *Typha* (*angustifolia, domingensis, latifolia*) Herbaceous Alliance

This vegetation community is located in the southwestern portion of the Conveyance Facilities project area and comprises collectively approximately 5 acres.

Mesquite thickets - Prosopis glandulosa - Prosopis velutina - Prosopis pubescens Woodland Alliance

This vegetation community is located in a small patch in the western portion of the Conveyance Facilities project area and comprises collectively approximately 88 acres. This community is considered sensitive with a State ranking of S3.

Land Cover Types

Developed – Agriculture

The majority of the Phase 1 project area and entire Phase 2 project area consists of this land cover type. The agricultural land cover type supports orchards and row crops. Crops found within this land cover type include alfalfa, cotton, potato, grape, and pistachio divided by dirt access roads. Additionally, much of the Conveyance Facilities project area consists of this land cover type, located in the northern and western portions.

Several small areas of bare ground occur along the edges of the access roads where equipment and materials are stored. This land cover type consists of approximately 1515,375 acres.

Developed – Urban

Several areas within the Phase 1 project area, mainly the eastern portion of the site, contain this land cover type that consists of private residences, businesses, storage yards, and buildings. A small area within the central portion of the Conveyance Facilities project area consists of this land cover type. This land cover type consists of approximately 11,905 acres.

Developed – Recharge Basins

Numerous recharge basins reside within the Phase 1 and Conveyance Facilities project areas. These recharge basins have been converted from previously used agricultural fields. Raised access roads run between the basins with large culverts under each road to connect the basins. As previously discussed, the recharge basins consist of a mix of non-native and native vegetation species such as Russian thistle, shortpod mustard, annual burrweed, horseweed, and allscale saltbush. The recharge basins are also intentionally planted with safflower and rye. This land cover type consists approximately 55,015 acres.

Open Water

The Outlet Canal runs through a small southwestern portion of the Conveyance Facilities project area and totals approximately 144 acres.

Wildlife

Numerous wildlife species were observed during the reconnaissance that are common to the region. Nomenclature for wildlife species observed or expected to occur within the project areas follow Jameson & Peeters (2004) for mammals, Jennings & Hayes (1994) and Stebbins (1985) for amphibians and reptiles, and Sibley (2013) for birds.

Avian species observed included killdeer (*Charadrius vociferous*), house finch (*Haemorhous mexicanus*), song sparrow (*Melospiza melodia*), Eurasian collared dove (*Streptopelia dec*aocto), California scrub jay (*Aphelocoma californica*), brown-headed cowbird (*Molothrus ater*), red-tailed hawk (*Buteo jamaicensis*), common raven (*Corvus corax*), western kingbird (*Tyrannus verticalis*), northern mockingbird (*Mimus polyglottos*), greater yellow legs (*Tringa melanoleuca*), great egret (*Ardea alb*a), great blue heron (*Ardea Herodias*), and cliff swallow (*Petrochelidon pyrrhonota*). Mammal species observed included desert cottontail (*Sylvilagus audubonii*), California ground squirrel (*Otospermophilus beecheyi*), coyote (*Canis latrans*), and tule elk (*Cervus canadensis nannodes*). One reptile species was observed, western fence lizard (*Sceloporus occidentalis*). No amphibians were observed.

Three special-status wildlife species were observed during the reconnaissance. Two separate Swainson's hawks (*Buteo swainsoni*) were observed flying overhead the Phase 2 project area. One California horned lark (*Eremophila alpestris actia*) was heard vocalizing within the interior orchards of the Phase 2 project area. One deceased American badger (*Taxidea taxus*) was observed along the southern boundary of the Phase 1 project area. The badger was most likely struck by a passing vehicle on Stockdale Highway, south of the southern boundary.

Numerous other common wildlife species are expected to forage and/or breed within the habitats that occur within the project areas that include, but are not limited to, deer mice (*Peromyscus* sp.), side-blotched lizard (*Uta* sp.), and red-shouldered hawk (*Buteo lineatus*).

Aquatic Resources

A formal jurisdictional delineation was not conducted; however, an investigation of potentially jurisdictional waters and wetlands was conducted to determine the location and size of the areas that could be defined as waters of the U.S. (WoUS), waters of the State (WoS), wetlands, or riparian habitat. Preliminary identification of potential jurisdictional areas within the project areas was based on a review of U.S. Geological Survey (USGS) 7.5-minute topographical maps, United States Department of Agriculture (USDA) Soil Survey Geographic Data Base and State Soil Geographic Data Base soil maps, National Wetlands Inventory data, Federal Emergency Management Agency flood zone data, and previous U.S. Army Corps of Engineers (USACE) jurisdictional determinations in the area. During the reconnaissance, the biologists visually estimated the structure and composition of onsite streambeds and vegetation in order to identify all areas potentially under USACE, Central Valley Regional Water Quality Control Board

(RWQCB), or CDFW jurisdiction. Active floodplains were identified using recent aerial photography and by identifying changes in the characteristics of vegetation and substrate composition. Several potential jurisdictional features were observed within or adjacent to the project areas and are discussed below.

Rosedale West Intake Canal

The Rosedale West Intake Canal is a manmade, soft-bottomed channel that conveys water to irrigate adjacent agriculture fields and recharge basins. The canal lies in a north-south direction and connects with the Goose Lake Channel to the north and the Cross Valley Canal to the south.

Goose Lake Channel

Goose Lake Channel is a natural, soft bottom channel comprised of dirt and sandy soils dominated by weedy plant species, such as Russian thistle and shortpod mustard. In the western portion of the channel, a small area of bulrush (*Scirpus* sp.) exists within the channel. The eastern portion of Goose Lake Channel, within Phase 1 project area has several Fremont's cottonwood (*Populus fremontii*) interspersed on the south side of the channel. The channel is gravity fed from the Kern River (when water is present and diverted for water management purposes) and flows from east to west and eventually settles into a small pond in the western portion of the Phase 1 project area.

East Side Canal

The East Side Canal is a soft-bottomed irrigation canal that originates from a common diversion at Manor Street in Bakersfield. From the common diversion, the canal travels south, where it ties in with the Outlet Canal, located on the Tule Elk State Reserve. The East Side Canal also abuts to the western boundary of the Phase 2 project area.

Outlet Canal

A portion of the Outlet Canal is located in the southwestern portion of the Conveyance Facilities project area and runs within the Tule Elk State Reserve. At the time of the reconnaissance, the biologists were unable to distinguish features (vegetation species and if water was present) due to access restrictions.

Cross Valley Canal (offsite)

The Cross Valley Canal is a paved canal with consistent, year-round flow that is located just south of the southern boundary of Phase 1 project area. The water in the Cross Valley Canal feeds the adjacent recharge basins within the project area.

Special Status Species and Sensitive Natural Communities

Due to a general decline in population and habitat of certain species throughout California as a result of urbanization, agriculture, and industrial development, state and federal agencies, particularly the USFWS and CDFW, have listed a number of wildlife and plant species as

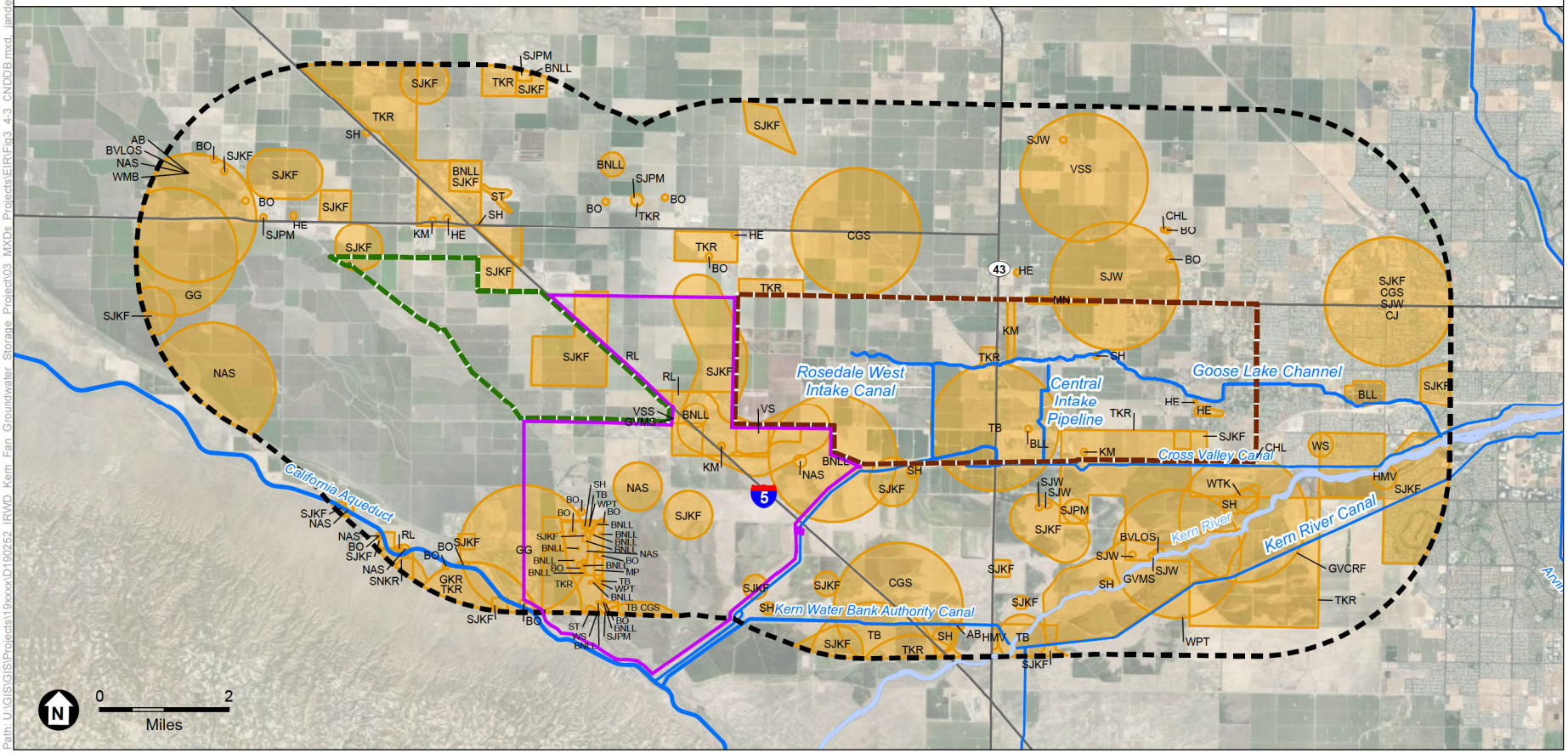
threatened, endangered, or otherwise vulnerable to decline. Moreover, a number of state, federal, and local laws have been adopted to restrict and/or mitigate activities that could potentially impact a listed species or its habitat directly, indirectly, or cumulatively. Appendix D provides tables describing each special-status wildlife and plant species and their potential to occur within the proposed project areas or vicinity, based on a nine-quadrangle radius which includes the Stevens United States Geological Survey (USGS) topographic quadrangle and surrounding eight quadrangles. These eight quadrangles include: East Elk Hills, Tupman, Rosedale, Millux, Mouth of Kern, Taft, and Buttonwillow (CDFW 2020). The following sections focus on those species with a medium to high potential to occur within the proposed project areas or which have been confirmed to be present on-site. Appendix D also describes the Sensitive Natural Communities within the nine quads listed above. **Figure 3.4-3** provides a more localized depiction of previously recorded species occurrence data per the CNDDB within a 3-mile radius of the proposed project areas. **Figure 3.4-4** depicts where special-status species were observed or detected during the reconnaissance.

Potential to occur was based on the following criteria:

- **Unlikely:** The project areas and/or immediate area do not support suitable habitat for a particular species, and therefore the project is unlikely to impact this species.
- **Low Potential:** The project areas only provides limited habitat for a particular species. In addition, the known range for a particular species may be outside of the biological survey area.
- **Medium Potential:** The project areas provide marginal habitat for a particular species.
- **High Potential:** The project areas provide suitable habitat conditions for a particular species and/or known populations occur in the immediate area.
- **Present**: The species has been observed or previously recorded (within the last 10 years) within the project areas.

The following is a brief description of the special-status wildlife and plant species that are known to occur, or have a medium to high potential to occur within the project areas, and the status of their presence based on the reconnaissance and documented references as discussed in Tables 1 and 2 of Appendix D. For a more detailed description of each species refer to Appendix D.

Phase 1 Project Area
Phase 2 Project Area
Kern Fan Conveyance Facilities Area
3-mile Buffer
CNDDB Occurrences
AB - American badger
BLL - Bakersfield legless lizard
BNLL - blunt-nosed leopard lizard
BO - burrowing owl
BVLOS - Buena Vista Lake ornate shrew
CGS - California glossy snake
CHL - California horned lark
CJ - California jewelflower
GG - giant gartersnake
GKR - giant kangaroo rat
GVCRF - Great Valley Cottonwood Riparian Forest
GVMS - Great Valley Mesquite Scrub
HE - Hoover's eriastrum
HMV - Horn's milk-vetch
KM - Kern mallow
MN - Mason's neststraw
MP - mountain plover
NAS - Nelson's antelope squirrel
RL - recurved larkspur
SH - Swainson's hawk
SJKF - San Joaquin kit fox
SJPM - San Joaquin Pocket Mouse
SJW - San Joaquin woollythreads
SNKR - short-nosed kangaroo rat
ST - slough thistle
ST - subtle orache
TB - tricolored blackbird
TKR - Tipton kangaroo rat
VS - Valley Sink Scrub
VSS - Valley Saltbush Scrub
WMB - western mastiff bat
WPT - western pond turtle
WS - western spadefoot
WTK - white-tailed kite



SOURCE: ESRI; Kern County; CDFW

Kern Fan Groundwater Storage Project

Figure 3.4-3

Special-Status Species (3-mile radius)

ESA

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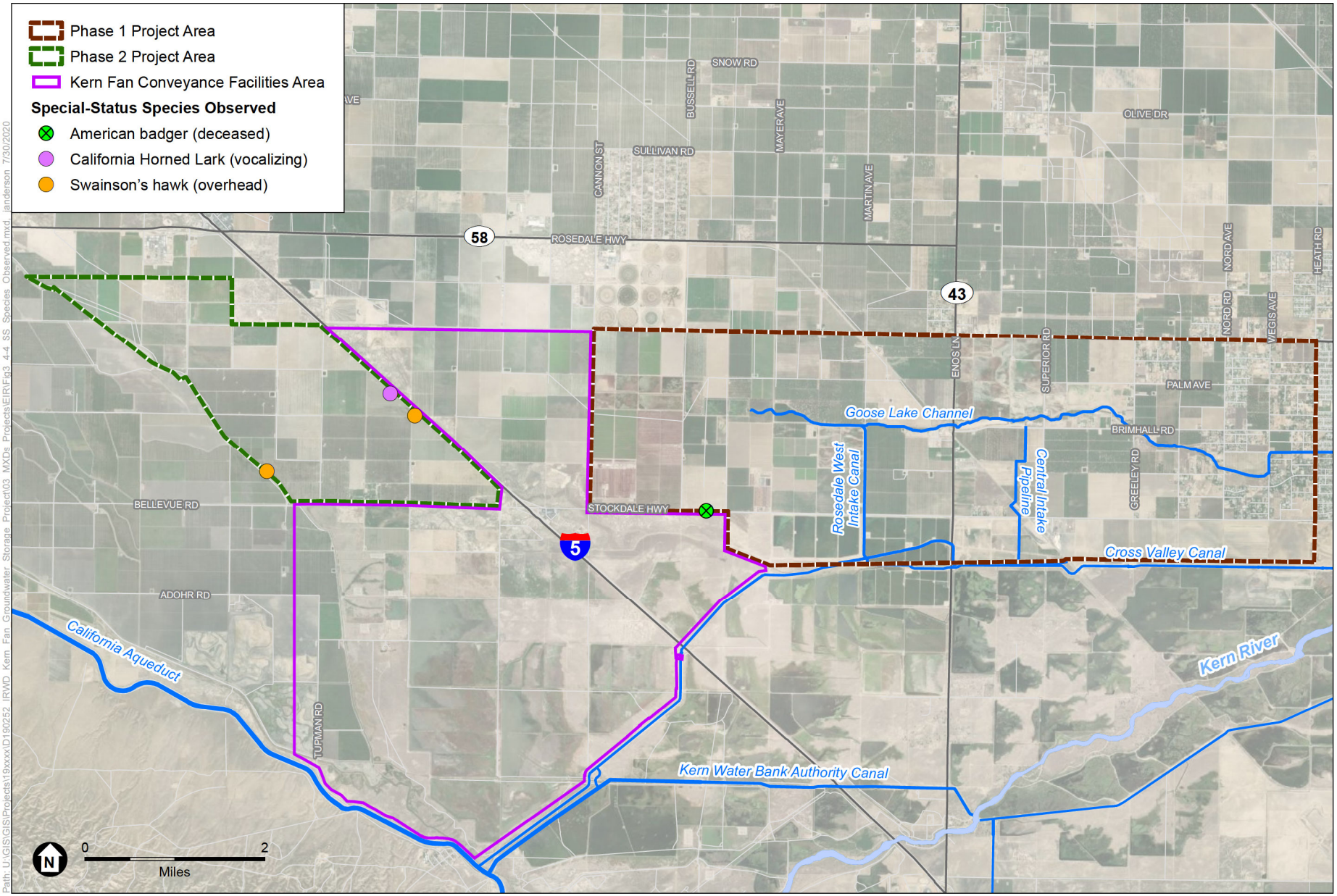

SOURCE: ESRI; Kern County

Kern Fan Groundwater Storage Project

Figure 3.4-4

Special-Status Species Observed

ESA

Reptiles

Blunt-Nosed Leopard Lizard

The blunt-nosed leopard lizard (*Gambelia sila)* is a federally endangered and state endangered/fully protected species and is endemic to the San Joaquin Valley of central California. This species typically inhabits open, sparsely vegetated areas of low relief on the San Joaquin Valley floor and in the surrounding foothills. Holland (1986) described the vegetative communities that blunt-nosed leopard lizards are most commonly found in as non-native grassland and Valley Sink Scrub communities. Other suitable habitat types on the Valley floor for this species include Valley Needlegrass Grassland (Holland 1986), Alkali Playa (Holland 1986), and Atriplex Grassland (USFWS 2010a). The blunt-nosed leopard lizard is considered to have a medium potential to occur on-site.

There are numerous CNDDB occurrences for the species within and adjacent to the project areas (CNDDB 2020); however, the majority of the occurrences are over 25 years old. Suitable habitat does occur on the proposed project areas within the non-native grassland, annual grasslands, and agriculture fields. No blunt-nosed leopard lizards were observed in the project areas during the July 2020 reconnaissance.

Birds

Swainson's Hawk

The Swainson's hawk (*Buteo swainson*) is a state threatened species and protected by the federal Migratory Bird Treaty Act. They nest in strands with few trees in juniper-sage flats, riparian areas, and in oak savannahs. They require suitable adjacent foraging areas such as grasslands or alfalfa and grain fields which support rodent populations (PPA 2006).

The species generally forages within 10 miles of their nest tree. Suitable nesting habitat does occur in the project areas as numerous trees were observed. No nests were observed within the project areas; however, two adult Swainson's hawks were observed flying over the Phase 2 project area and is considered present on-site (see Figure 3.4-4)

Burrowing Owl

Burrowing owl (*Athene cunicularia*) is a California Species of Special Concern. This small, ground-dwelling owl lives in ground squirrel and other mammal burrows that it appropriates and enlarges for its purposes. It typically is found in short-grass grasslands, open scrub habitats, and a variety of open, human-altered environments, such as golf courses, airport runways and agricultural fields. The burrowing owl is considered to have a high potential to occur in the project areas.

No focused burrowing owl surveys were conducted; however, the reconnaissance-level habitat assessment found that the project areas contain suitable burrowing owl habitat within the non-native grassland, annual grassland, agriculture fields, and earthen berms that line the agricultural fields and access roads. No burrowing owls were observed during the July 2020 reconnaissance.

Tricolored Blackbird

The tricolored blackbird (*Agelaius tricolor*) prefers wetland and grassland habitats, although most native types of these habitats have been lost. Within the San Joaquin Valley, breeding colonies live mainly in the pasturelands, but can also be found in chaparral, orange and avocado groves, sagebrush grasslands, and salt-marsh habitat. Nesting takes place in native emergent marshes, grain fields, thickets of Himalayan blackberry (*Rubus armeniacus*), and other flooded and upland habitats (NatureServe 2012a). The tricolored blackbird is considered to have a medium potential to occur in the project areas.

The open water canals and agricultural fields on and near the project areas can support this species. Tricolored blackbirds have several CNDDB occurrences on and adjacent to the project areas; however, they are over 25 years old. No tricolored blackbirds were observed during the July 2020 reconnaissance.

California-Horned Lark

The California horned-lark (*Eremophila alpestris actia*) prefers habitats consisting of open ground, farmland, prairies and deserts. Within the San Joaquin Valley, the species mainly lives in the open ground and farmland habitats.

This species was detected vocalizing within the orchards of the Phase 2 project area (see Figure 3.4-4) and is expected to utilize all project areas.

Mammals

Nelson's Antelope Squirrel

Nelson's antelope squirrel (*Ammospermophilus nelson*) is a state threatened species. It is a permanent resident of the western San Joaquin Valley from 60-360 meters in elevation on dry, sparsely vegetated, loam soils. It can be found from southern Merced County south to Kern, Kings, and Tulare Counties. The species also occurs in portions of eastern San Luis Obispo and Santa Barbara Counties. Suitable habitat has widely scattered alkali scrub vegetation and shrubs, annual forbs and grasses, and is distributed over broken terrain with small gullies and dry washes with sandy loam soils (Zeiner et al. 1988-1990). The Nelson's antelope squirrel is considered to have a medium potential to occur in the project areas.

Suitable habitat for the species exists in the project areas within the non-native grassland, annual grassland, agricultural fields, and many of the earthen berms adjacent to the numerous access roads. Occurrence records for the species have also been recorded to the CNDDB within the Conveyance Facilities project area; however, these occurrences are over 30 years old. No Nelson's antelope squirrels were observed during the July 2020 reconnaissance.

Tipton Kangaroo Rat

The Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) is a California and federally listed endangered species. Tipton kangaroo rats eat mostly seeds, with small amounts of green, herbaceous vegetation and insects supplementing their diet when available. Burrow systems are usually in open areas but may occur in areas of thick scrub. Current occurrences are limited to scattered, isolated areas. In the southern San Joaquin Valley this includes the Kern National

Wildlife Refuge, Delano, and other scattered areas within Kern County. The Tipton kangaroo rat is considered to have a medium potential to occur in the project areas.

Suitable habitat for the species exists in the project areas in the non-native grassland, annual; grassland, agricultural fields, and many of the earthen berms along the access roads on the project areas. Several CNDDB occurrences have been made on the project areas; however, they are over approximately 30 years old. No Tipton kangaroo rat or sign of was observed during the July 2020 reconnaissance.

San Joaquin Kit Fox

The San Joaquin kit fox (*Vulpes macrotis mutica*) is a state threatened and federally listed endangered species. They feed primarily on ground squirrels, kangaroo rats, desert cottontails, mice, insects, carrion and ground-nesting birds. Their habitat includes the San Joaquin Valley and Kern County area (USFWS 2010b). Based on such habitat requirements, San Joaquin kit fox is considered to have a high potential to occur in the project areas.

Suitable habitat for the species occurs within the non-native grassland, annual grassland, agriculture fields, and the earthen berms located adjacent to the many access roads on the project areas. Several CNDDB occurrences have been made on the project areas; however, they are all over 30 years old. No San Joaquin kit fox or sign of was observed during the July 2020 reconnaissance.

American Badger

The American badger (*Taxidea taxus*) is a California Species of Special Concern. The range of the American badger includes most of the State, with the exception of the northwestern forests. Badgers occupy a variety of habitats, including grasslands, savannas, and mountain meadows where soils are suitable for digging for their preferred prey, large rodents such as ground squirrels, gophers, and kangaroo rats (NatureServe 2012b). The American badger is considered to be present within the project areas, as a single deceased American badger was observed along the southern boundary of the Phase 1 project area (see Figure 3.4-4). The badger most likely collided with a passing vehicle on Stockdale Highway.

Special-Status Plant Species

Precipitation for 2019 - 2020 was typical in the project region as well as throughout most of the State (NOAA 2020). Therefore, floristic representation at the time of the survey would have been typical for the month of July.

Based on the database search results, special-status plant species with a medium potential to occur in the project areas are briefly described below. For a more detailed description of special-status plant species, please refer to Appendix D.

Subtle orache

Subtle orache (*Atriplex subtilis*) has a CNPS status of 1B.2. This species is an annual herb with a blooming period between August and September. Subtle orache is found in valley and foothill grasslands.

California jewelflower

California jewelflower (*Caulanthus californicus*) is a federally endangered and state candidate endangered species and has a CNPS status of 1B.1. This species is an annual herb with a blooming period between February and May. California jewelflower is found in chenopod scrub, pinyon and juniper woodlands and valley and foothill grasslands.

Slough thistle

Slough thistle (*Cirsium crassicaule*) has a CNPS status of 1B.1. This species is an annual/perennial herb with a blooming period between May and August. Slough thistle is found in chenopod scrub, marshes and swamps (sloughs) and riparian scrub.

Hoover's eriastrum

Hoover's eriastrum (*Eriastrum hooveri*) has been federally de-listed and has a CNPS status of 4.2. This species is an annual herb with a blooming period between March and July. Hoover's eriastrum prefers gravelly soils supporting chenopod scrub, pinyon and juniper woodland, and valley and foothill grasslands.

Kern mallow

Kern mallow (*Eremalche kemensis*) is a federally listed endangered species with a CNPS status of 1B.2. This species is an annual herb with a flowering period between March and May. Kern mallow is found within chenopod scrub and valley and foothill grassland habitat.

San Joaquin woollythreads

San Joaquin woollythreads (*Monolopia congdonii*) is a federally endangered species with a CNPS status of 1B.2. This species is an annual herb with a blooming period between February and May. San Joaquin woollythreads is found in chenopod scrub and valley and foothill grasslands.

Recurved larkspur

Recurved larkspur (*Delphinium recurvatum*) has a CNPS status of 1B.2. This species is a perennial herb with a blooming period between March and June. Recurved larkspur is found in chenopod scrub, cismontane woodlands and valley and foothill grasslands.

Sensitive Natural Communities

Sensitive natural communities are listed by CDFW on their List of Vegetation Alliances and Associations (CDFG 2010). Communities on this list are given a Global (G) and State (S) rarity ranking on a scale of 1 to 5, where communities with a ranking of 5 are the most common and communities with a ranking of 1 are the rarest and of the highest priority to preserve. For the purpose of this report, sensitive natural communities are those communities that have a state ranking of S3 or rarer, and are generally those that are considered by the CDFW to be imperiled due to their decline in the region and/or the habitat they provide to rare and endemic wildlife species. Continued degradation and destruction of these ecologically important communities could threaten the regional distribution and viability of the community and possibly the sensitive species they support.

A review of the most recent CNDDB records revealed five sensitive natural communities have been recorded in the vicinity of the proposed project that include Great Valley Cottonwood Riparian Forest, Great Valley Mesquite Scrub, Valley Sacaton Grassland, Valley Saltbush, and Valley Sink Scrub; however, none of these communities occur within the project areas.

After reviewing the vegetation communities mapped by California State University, Chico, there are five native vegetation communities that are considered sensitive within the Conveyance Facilities project area, including: Bush seepweed scrub - *Suaeda moquinii* Shrubland Alliance, Goodding's willow - *Salix gooddingii* Forest & Woodland Alliance, Red willow - *Salix laevigata* Woodland and Forest Alliance, Iodine brush scrub - *Allenrolfea occidentalis* Shrubland Alliance, and Mesquite thickets - *Prosopis glandulosa - Prosopis velutina - Prosopis pubescens* Woodland Alliance, all with an S3 ranking.

Wildlife Movement Corridors

Wildlife movement corridors are areas where regional wildlife populations regularly and predictably move during dispersal or migration. Movement corridors in California are typically associated with ridgelines, valleys, rivers and creeks supporting riparian vegetation. Movement corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, by human disturbance, or by the encroachment of urban development. Movement corridors are important as the combination of topography and other natural factors, in addition to urbanization, has fragmented or separated large open space areas. Several wildlife corridors are present within or adjacent to the project areas and are described below.

The Central Valley as a whole, is a wildlife corridor and resting stop for migrating birds along the Pacific Flyway. The Pacific Flyway is a major north-south flyway for migratory birds in America, extending from Alaska to Patagonia. Every year, migratory birds travel some or all of this distance both in spring and in fall, following food sources, heading to breeding grounds, or travelling to overwintering areas. Bird that are migrating along the Pacific Flyway may stop to rest within the recharge basins, Goose Lake Channel or numerous canals in the area to feed and/or rest before continuing their migration. Some species may remain locally for the entire season, but most stay a few days before moving on (Wilson 2010).

Goose Lake Channel, situated within the Phase 1 project area, is considered a wildlife corridor. Goose Lake Channel is a natural channel that flows in an east to west direction and originates from the Kern River. Water is fed from the Kern River by gravity into the channel, which provides water for the recharge basins within the Phase 1 project area. In an on-site discussion with Rosedale Engineer Technician Markus Nygren, he related that Goose Lake Channel provides habitat for aquatic species such as largemouth bass (*Micropterus salmoides*) that come from the Kern River. Additionally, Mr. Nygren has observed waterfowl species such as mallard (*Anas platyrhynchos*) and northern shoveler (*Spatula clypeata*) using the channel, when water is present, for foraging (M. Nygren personal communication, July 7, 2020).

The Kern Water Bank is located within the Conveyance Facilities project area. This area is relatively flat and potentially creates a corridor to both the Phase 1 and Phase 2 project areas. The

habitat value of the Kern Water Bank is deemed high, as the many of the native vegetation communities and habitats have not been disturbed or altered. Migratory and common birds use the recharge basins at the Kern Water Bank as habitat. The American badger that was observed deceased at the southern boundary of the Phase 1 project area during the reconnaissance survey was likely traveling from the Phase 1 project area to the Kern Water Bank property, or vice versa.

3.4.2 Regulatory Setting

Federal

Endangered Species Act

The United States Congress passed the Federal Endangered Species Act (FESA) in 1973 to protect those species that are endangered or threatened with extinction. FESA is intended to operate in conjunction with the National Environmental Policy Act to help protect the ecosystems upon which endangered and threatened species depend. FESA prohibits the "take" of endangered or threatened wildlife species. "Take" is defined to include harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species or any attempt to engage in such conduct (*FESA* Section 3 [(3)(19)]). Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns (50 *Code of Federal Regulations* [CFR] Section 17.3). "Harass" is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns (50 *CFR* Section 17.3). Actions that result in take can result in civil or criminal penalties.

Migratory Bird Treaty Act

The MBTA generally prohibits the killing, possessing, or trading of migratory birds, bird parts, eggs, and nests, except as provided by the statute. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds. It further provides that it is unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (16 *United States Code* [USC] Section 703). As amended by U.S. Department of the Interior Solicitor's Opinion M-37050 in December 22, 2017 and subsequently by USFWS guidance issued on April 11, 2018, the accidental or incidental take of birds resulting from an activity is not prohibited by the MBTA when the underlying purpose is not to take birds. If the purpose of the action is not to take birds, Opinion M-37050 allows both the direct take of birds and their nests and indirect or incidental take that results in the direct loss of birds, nests, or eggs (USDOI 2017; USFWS 2018). Thus, the federal MBTA definition of "take" does not prohibit or penalize the incidental take of migratory birds that results from actions that are performed without motivation to harm birds. This interpretation differs from the prior federal interpretation of "take", which prohibited all incidental take of migratory birds, whether intentional or incidental.

The MBTA, first enacted in 1916, prohibits any person, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory

bird, included in the terms of this Convention…for the protection of migratory birds…or any part, nest, or egg of any such bird" (16 U.S. Code 703).

Fish and Wildlife Conservation Act

The Fish and Wildlife Conservation Act declares that fish and wildlife are of ecological, educational, aesthetic, cultural, recreational, economic, and scientific value to the United States. The purposes of this Act are to encourage all federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities and to conserve and to promote conservation of non-game fish and wildlife and their habitats. Another purpose is to provide financial and technical assistance to the states for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife.

Clean Water Act

Section 404 and Wetlands

In accordance with Section 404 of the federal Clean Water Act (CWA), the USACE regulates discharge of dredged or fill material into waters of the United States. Waters of the United States and their lateral limits are defined in Title 33, Part 328.3(a) of the Code of Federal Regulations to include navigable waters of the United States, interstate waters, all other waters subject to the ebb and flow of the tide, and all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Waters of the United States are often categorized as "jurisdictional wetlands" (i.e., wetlands over which USACE exercises jurisdiction under Section 404) and "other waters of the United States" when habitat values and characteristics are being described. "Fill" is defined as any material that replaces any portion of a water of the United States with dry land or that changes the bottom elevation of any portion of a water of the United States. Any activity resulting in the placement of dredged or fill material within waters of the United States requires a permit from USACE.

Wetlands are a subset of "waters of the United States" and receive protection under Section 404 of the CWA. Wetlands are defined by the federal government as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 *CFR* Section 328.3(c)(16)). Waters of the U.S. do not include prior converted cropland (33 *CFR* Section 328.3(b)(6)). Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with U.S. Environmental Protection Agency (EPA) ((33 *CFR* Section 328.3(a)(8) added 58 FR 45035, August 25, 1993).

Section 401

Under Section 401 of the federal CWA, the Central Valley RWQCB must certify that actions receiving authorization under Section 404 of the CWA also meet state water quality standards.

State

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, waters of the state fall under the jurisdiction of the appropriate RWQCB. Under the act, the RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA. The RWQCB requires projects to avoid impacts to wetlands if feasible and requires that projects do not result in a net loss of wetland acreage or a net loss of wetland function and values. The RWQCB typically requires compensatory mitigation for impacts to wetlands and/or waters of the state. The RWQCB also has jurisdiction over waters deemed 'isolated' or not subject to Section 404 jurisdiction under *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (SWANCC). Dredging, filling, or excavation of isolated waters constitutes a discharge of waste to waters of the state and prospective dischargers are required obtain authorization through an Order of Waste Discharge or waiver thereof from the RWQCB and comply with other requirements of Porter-Cologne Act.

California Endangered Species Act (CESA)

Under CESA, the CDFW is responsible for maintaining a list of threatened and endangered species (California Fish and Game Code 2007), candidate species, and species of special concern. Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state listed endangered or threatened species may be present on the project region and determine whether the proposed project would have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that may impact a candidate species. If there were project-related impacts to species on the CESA threatened and endangered list, they would be considered "significant." Impacts to "species of concern" would be considered "significant" under certain circumstances, discussed below.

California Fish and Game Code Section 1600 et seq.

CDFW regulates activities that would interfere with the natural flow of, or substantially alter, a channel, bed, or bank of a lake, river, or stream. These activities are regulated under the *California Fish and Game Code* Sections 1600-1616. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying CDFW: substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. Requirements to protect the integrity of biological resources and water quality are often conditions of streambed alteration agreements. Requirements may include avoidance or minimization of the use of heavy equipment, limitations on work periods to avoid impacts on wildlife and fisheries resources, and measures to restore degraded areas or compensate

for permanent habitat losses. A Streambed Alteration Agreement may be required by CDFW for construction activities that could result in an accidental release into a jurisdictional area.

A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Unlike the federal government, California has adopted the Cowardin, et al. (1979) definition of wetlands. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes (at least 50 percent of the aerial vegetative cover); (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Under normal circumstances, the federal definition of wetlands requires all three wetland identification parameters to be met, whereas the Cowardin definition requires the presence of at least one of these parameters. For this reason, identification of wetlands by state agencies consists of the union of all areas that are periodically inundated or saturated, or in which at least seasonal dominance by hydrophytes may be documented, or in which hydric soils are present.

Both state and federal wetland laws require that the biological and hydrological functions, which are lost when a wetland or water is altered or filled, be replaced as part of the respective permit processes. Compensatory actions include replacement of lost wetland acreage, usually in amounts substantially greater than the amount lost.

California Fish and Game Code Sections 2080 et seq.

Section 2080 of the California Fish and Game Code states, "No person shall import into this state [California], export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the [California Fish and Game] commission determines to be an endangered species or threatened species, or attempt any of those acts, except as otherwise provided in this Chapter, or the Native Plant Protection Act, or the California Desert Native Plants Act." Pursuant to Section 2081, CDFW may authorize individuals or public agencies to import, export, take, or possess, any state-listed endangered, threatened, or candidate species. These otherwise prohibited acts may be authorized through permits or Memoranda of Understanding if: (1) the take is incidental to an otherwise lawful activity; (2) impacts of the authorized take are minimized and fully mitigated; (3) the permit is consistent with any regulations adopted pursuant to any recovery plan for the species; and (4) the applicant ensures adequate funding to implement the measures required by CDFW. CDFW makes this determination based on available scientific information and considers the ability of the species to survive and reproduce.

California Fish and Game Code Sections 3503

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

California Fish and Game Code Sections 3511, 4700, 5050, and 5515

Protection of fully protected species is described in sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species. CDFW is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. CDFW has informed nonfederal agencies and private parties that they must avoid take of any fully protected species in carrying out projects.

California Environmental Quality Act Guidelines, Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, *CEQA Guidelines* Section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the Section of the California Fish and Game Code dealing with rare or endangered plants or animals. This Section was included in the *CEQA Guidelines* primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on, for example, a candidate species that has not been listed by either USFWS or CDFW. Thus, CEQA provides an agency with the ability to protect a species from the potential impacts of a project until the respective government agencies have an opportunity to designate the species as protected, if warranted. CEQA also calls for the protection of other locally or regionally significant resources, including natural communities. Although natural communities do not at present have legal protection of any kind, CEQA calls for an assessment of whether any such resources would be affected, and requires findings of significance if there would be substantial losses. Natural communities listed by CNDDB as sensitive are considered by CDFW to be significant resources and fall under the *CEQA Guidelines* for addressing impacts. Local planning documents such as general plans often identify these resources as well.

Native Plant Protection Act

The Native Plant Protection Act (*California Fish and Game Code* Sections 1900 et seq.) includes measures to preserve, protect, and enhance rare and endangered native plants. The list of native plants afforded protection pursuant to the Native Plant Protection Act includes those listed as rare and endangered under the CESA. The Native Plant Protection Act provides limitations on take as follows: “No person will import into this State, or take, possess, or sell within this State” any rare or endangered native plant, except in compliance with provisions of the act. Individual

landowners are required to notify the CDFW at least 10 days in advance of changing land uses to allow the CDFW to salvage any rare or endangered native plant material.

Regional or Local

Kern County General Plan

This regulatory framework identifies the federal, state, and local statutes, ordinances, or policies that govern the conservation and protection of biological resources that must be considered by the County during the decision-making process for projects that have the potential to affect biological resources. The Kern County General Plan includes the following goals related to biological resources:

1.10.5 Threatened and Endangered Species

Policies

Policy 27 Threatened or endangered plant and wildlife species should be protected in accordance with State and federal laws.

Policy 28 County should work closely with State and federal agencies to assure that discretionary projects avoid or minimize impacts on fish, wildlife, and botanical resources.

Policy 29 County will seek cooperative efforts with local, State, and federal agencies to protect listed threatened and endangered plant and wildlife species through the use of conservation plans and other methods promoting management and conservation of habitat lands.

Policy 32 Riparian areas will be managed in accordance with the USACE and the CDFG rules and regulations to enhance the drainage, flood control, biological, recreational, and other beneficial uses while acknowledging existing land use patterns.

Implementation Measures

Q. Discretionary projects shall consider effects to biological resources as required by CEQA.

R. Consult and consider the comments from responsible and trustee wildlife agencies when reviewing a discretionary project subject to CEQA.

S. Pursue the development and implementation of conservation programs with State and federal wildlife agencies for property owners desiring streamlined endangered species mitigation programs.

Bakersfield General Plan

The project areas are also located within the area governed by the *Metropolitan Bakersfield General Plan* (City of Bakersfield and Kern County 2002). Within the Conservation Element *Biological Resources* Section of the Bakersfield General Plan, there are goals, policies, and an implementation measure that are applicable to the proposed project:

- Goal 1: Conserve and enhance Bakersfield's biological resources in a manner which facilitates orderly development and reflect the sensitivities and constraints of these resources.
- Goal 2: To conserve and enhance habitat areas for designated "sensitive" animal and plant species.
- Policy 1: Direct development away from "sensitive biological resource" areas, unless effective mitigation can be implemented.
- Policy 2: Preserve areas of riparian vegetation and wildlife habitat within floodways and along rivers and streams, in accordance with the Kern River Plan Element and channel maintenance programs designed to maintain flood flow discharge capacity.
- Implementation 3: Preserve habitat and avoid "take" of protected species as required in the Metropolitan Bakersfield Habitat Conservation Plan.

Metropolitan Bakersfield Habitat Conservation Plan

The Metropolitan Bakersfield Habitat Conservation Plan (MBHCP) addresses the effect of urban growth on federally and State protected plant and animal species within the Metropolitan Bakersfield 2010 General Plan area. The MBHCP is a joint program of the City of Bakersfield and Kern County that was undertaken to assist urban development applicants in complying with State and federal endangered species laws. The MBHCP utilizes a mitigation fee paid by applicants for grading or building permits to fund the purchase and maintenance of habitat land to compensate for the effects of urban development on endangered species habitat. Approximately 60% of the Phase 1 project area falls within the MBHCP area. However, the MBHCP finds that "commercial agricultural" activities are exempt from the requirements of the plan. Therefore, the proposed project would not be subject to MBHCP requirements.

Kern Water Bank Habitat Conservation Plan (HCP)/Natural Community Conservation Plan (NCCP)

The project areas are also located within the area governed by the Kern Water Bank HCP/NCCP. The Kern Water Bank HCP/NCCP goal is to accomplish both water conservation and environmental objectives. Only the Kern Water Bank Authority is authorized to implement covered activities within the HCP/NCCP area that may result in take of covered species (KWBA 1997). The HCP/NCCP area is within the Conveyance Facilities project area.

3.4.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to biological resources. The proposed project would have a significant impact if it would:

1. 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.

2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.
3. 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.
4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.
7. Result in cumulatively considerable impacts to biological resources.

Impact Analysis

The proposed project is expected to result in both adverse and beneficial impacts—direct, indirect, and cumulative—to biological resources. There are construction, operational, and maintenance impacts that could result in adverse impacts. Beneficial impacts could occur from the operation and maintenance of the proposed project and include the creation of intermediate wetlands and bird habitat and the provision of water for fisheries. In this section, we examine and describe both impact types. Impact mechanisms from construction, operations, and maintenance activities used to evaluate the adverse and beneficial impacts are as follows:

- **Habitat modification (adverse).** Direct or indirect impacts could result from habitat modification during construction, operations, and maintenance. Impacts to biological resources would result primarily during earth and vegetation/orchard removal, grading, digging, and equipment movement during construction. Vegetation and facility maintenance during operations and maintenance could also result in impacts. More mobile species like birds and larger mammals are expected to disperse into nearby habitat areas during activities. Active nesting birds and active burrows for species such as blunt-nosed leopard lizard and Tipton kangaroo rat could potentially be impacted by grading and vegetation removal and maintenance activities. These activities could result in the direct mortality from the crushing of occupied burrows or destruction of occupied nests. Special-status plant species with potential to occur onsite could also be impacted by construction and maintenance activities. This includes known occurrences and species with a potential to occur within the conveyance facilities project site. Direct impacts include trampling or destruction of the plants from construction equipment or removal during maintenance activities.
- **Habitat modification (beneficial).** Intermittent wetlands will be established during recharge events in the recharge basins during proposed project operation. During the years that the proposed project takes and recharges water into storage, the basins will be inundated with water and will provide intermittent wetland habitat to support waterfowl, shorebirds, raptors and other migratory birds along the Pacific Flyway. The fishery ecosystem and special-status fish species associated with the Sacramento-San Joaquin River Delta (Delta) could be beneficially affected by habitat modifications during operations of the proposed project. The

fishery ecosystem and special-status fish species benefits are detailed in Appendix D and summarized in the impact analysis below.

- **Exterior lighting (adverse).** Use of nighttime lighting on the project sites could affect the level of use by wildlife. Nighttime lighting could potentially expose special-status species trying to evade predators within their habitats.
- **Vehicle collisions (adverse)**. The use of access roads by construction/maintenance vehicles could result in accidental road-mortality if these species occur on roads during construction and operations and maintenance activities. Vehicles could cause direct mortality or injury to wildlife that are unable to move out of the way of vehicle traffic. Vehicle and equipment travel on dirt access roads during operation and maintenance may disturb special-status wildlife and plant species. Vehicle collisions with San Joaquin kit fox, American badger, burrowing owl and other medium-large species could occur.

Special-Status Species

Impact 3.4-1: The proposed project could 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. (*Less than Significant Impact with Mitigation*)

Construction

Reptiles. Construction activities associated with the proposed project could result in adverse impacts to blunt-nosed leopard lizard. Direct impacts to blunt-nosed leopard lizard would involve the removal of the non-native grassland, which is suitable habitat for the species. Implementation of **Mitigation Measure BIO-1** would reduce potential impacts to blunt-nosed leopard lizard to a less than significant level. Mitigation Measure BIO-1 requires protocol level surveys to be conducted in accordance with the CDFW *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard* and, if necessary, subsequent surveys to determine measures for avoidance, minimization, restoration, preservation, or compensation.

Birds. Construction activities associated with the proposed project could result in adverse impacts to migratory birds protected under the MBTA and special-status bird species, including Swainson's hawk, burrowing owl, California horned-lark, and tricolored blackbird.

Direct impacts to migratory birds and special-status bird species, including raptors, the Watch List species California horned-lark (detected on-site during reconnaissance), and the State threatened tricolored blackbird, would involve the removal/disturbance of the non-native grassland, active agricultural fields, which have the potential to provide nesting opportunities for resident birds. Removal of nesting habitat during the breeding season could result in the direct mortality of birds. Vegetation and tree removal, construction noise, vibrations, and human disturbance could cause nest abandonment, death of the young, or loss of reproductive potential at active nests located near proposed project activities. Implementation of **Mitigation Measure BIO-2** would reduce potential impacts to special-status, common nesting and migratory birds to less than significant levels.

The State threatened Swainson's hawk was observed flying overhead of the Phase 2 project area during the reconnaissance survey, so the species is considered present on-site. The project areas provide potential foraging habitat for this species. Foraging habitat includes non-native and annual grasslands that support rodent populations. Additionally, the project areas contain numerous tall trees, which is suitable nesting habitat for the species. To avoid impacts to the species, preconstruction surveys would be conducted as described in **Mitigation Measure BIO-3**, with additional measures implemented to avoid disturbance in the event the species is detected. With implementation of Mitigation Measure BIO-3, any impacts to Swainson's hawk would be less than significant.

Burrowing owl suitable habitat was observed within the project areas, which includes non-native and annual grasslands, agriculture fields and the earthen berms located adjacent to access roads. As a State Species of Special Concern, displacement of burrowing owls would be considered a significant impact. Burrowing owl surveys would be required prior to project implementation and would be conducted according to the *Staff Report on Burrowing Owl Mitigation* prepared by CDFW (2012). With implementation of **Mitigation Measure BIO-4**, any impacts to the burrowing owl would be less than significant.

Mammals. The project areas contain suitable habitat for three special-status mammal species, including an additional special-status species that was observed on-site during the reconnaissance survey. San Joaquin kit fox, Tipton kangaroo rat and Nelson's antelope squirrel are three species that have a medium or high potential to occur on site based on past CNDDB detections and observed suitable habitat. The additional special-status species observed on-site is American badger.

Construction activities associated with the proposed project could result in adverse impacts to San Joaquin kit fox. No burrows or dens were observed during the reconnaissance; however, the non-native and annual grasslands and earthen berms provide suitable habitat. Any impact to this State threatened and federally endangered species would be significant. With implementation of **Mitigation Measure BIO-5,** potential impacts to the San Joaquin kit fox would be reduced to a less than significant level. Mitigation Measure BIO-5 requires the USFWS "early evaluation" be completed in accordance with its most recent *San Joaquin Kit Fox Survey Protocol*, and, if necessary, subsequent surveys to determine measures for avoidance, minimization, restoration, preservation, or compensation.

The federally and State endangered Tipton kangaroo rat and federally threatened Nelson's antelope squirrel could also be subject to adverse impacts to their habitats on-site. Implementation of **Mitigation Measure BIO-6** would reduce impacts to Tipton kangaroo rat to a less than significant level. Mitigation Measure BIO-6 requires protocol level surveys to be conducted with the USFWS *Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats*, and if necessary, subsequent surveys and consultation with CDFW and USFWS to determine measures for avoidance, minimization, restoration, preservation, or compensation. Implementation of **Mitigation Measure BIO-7** would reduce impacts to Nelson's antelope squirrel to a less than significant level. Mitigation Measure BIO-7 requires a qualified biologist to survey for Nelson's

antelope squirrel, and if necessary to determine measures for avoidance, minimization, restoration, preservation, or compensation.

An adult, deceased American badger was observed along the southern boundary of the Phase 1 project area, immediately adjacent to Stockdale Highway. Though no burrows or dens were observed during the reconnaissance survey, suitable habitat exists in the project areas including the non-native and annual grasslands and agriculture fields. Implementation of **Mitigation Measure BIO-8** would reduce impacts to American badger to a less than significant level. Mitigation Measure BIO-8 should be conducted concurrently to Mitigation Measures BIO-4 and BIO-5, as American badger share similar habitat as burrowing owl and San Joaquin kit fox.

Plants. Based on the disturbed and developed conditions of the Phase 1 and Phase 2 project areas, special-status plant species are not expected to occur. Suitable habitat for special-status plant species, however, does exist within the Conveyance Facilities project area. There is a medium potential for seven special-status plant species to occur, including California jewelflower, Hoover's eriastrum, Kern mallow, recurved larkspur, San Joaquin woollythreads, slough thistle, and subtle orache. Implementation of **Mitigation Measure BIO-9** would identify any special-status plants that occur within the Conveyance Facilities project area, and if necessary, require implementation of avoidance measures, or if avoidance is not feasible then implementation of a Revegetation/Restoration Mitigation Plan.

Mitigation Measures

BIO-1. Prior to commencement of project ground disturbing construction, a qualified biologist shall survey for blunt-nosed leopard lizard, in accordance with the most recent CDFW *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*. If it is determined that blunt-nosed leopard lizard is present within the project areas, the Authority shall initiate the appropriate project modifications to protect blunt-nosed leopard lizard, including avoidance, minimization, restoration, preservation, or compensation.

BIO-2. If the nesting bird season cannot be avoided and construction or vegetation removal occurs between March 1 – September 15 (January 1 to July 31 for raptors), the following measures would reduce potential impacts to nesting and migratory birds and raptors to less than significant levels:

- Within 15 days of site clearing, a qualified biologist shall conduct a preconstruction, migratory bird and raptor nesting survey. The biologist must be qualified to determine the status and stage of nesting by migratory birds and all locally breeding raptor species without causing intrusive disturbance. This survey shall include species protected under the Migratory Bird Treaty Act including California horned lark, which was detected during the July 2020 reconnaissance and tri-colored blackbird, which has a medium potential to occur on-site. The survey shall cover all reasonably potential nesting locations for the relevant species on or closely adjacent to the proposed project site.

- The preconstruction survey shall cover all reasonably potential nesting locations on and within 300 feet of the proposed removal areas, and areas that would be occupied by ground-nesting species such as killdeer. A 500-foot radius shall be

surveyed in areas containing suitable habitat for nesting raptors, such as trees, utility poles and buildings.

- Nesting habitat should be removed prior to the bird breeding season (March 1 – September 15).

- If an active nest is confirmed by the biologist, no construction activities shall occur within 250 feet of the nesting site for migratory birds and within 500 feet of the nesting site for raptors. The buffer zones around any nest within which project-related construction activities would be avoided can be reduced as determined acceptable by a qualified biologist. Construction activities may resume once the breeding season ends (March 1 – September 15), or the nest has either failed or the birds have fledged.

BIO-3. If construction activities are scheduled to take place outside of the Swainson's hawk nesting season (which runs from March 1 – September 15), then no preconstruction clearance surveys or subsequent avoidance buffers are required. If construction activities are initiated within the nesting season then preconstruction nesting surveys shall be conducted by a qualified biologist prior to ground disturbance, in accordance with the guidance provided in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee, 2000). The required windshield surveys shall cover a one-half mile radius around the project sites. If a nest site is found, the qualified biologist shall determine the appropriate buffer zone around the nest within which project-related construction activities would be avoided.

BIO-4. A pre-construction survey shall be conducted for burrowing owls 14 to 30 days prior to clearing of the site by a qualified biologist in accordance with the most recent CDFW protocol, currently the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). Surveys shall cover suitable burrowing owl habitat disturbed by construction including a 500-foot buffer. The survey would identify adult and juvenile burrowing owls and signs of burrowing owl occupation. This survey shall include two early morning surveys and two evening surveys to ensure that all owl pairs have been located. If occupied burrowing owl habitat is detected on the proposed project site, measures to avoid, minimize, or mitigate impacts shall be incorporated into the proposed project and shall include, but not be limited to, the following:

- If owls are identified on or adjacent to the site, a qualified biologist shall provide a pre-construction Worker's Environmental Awareness Program to contractors and their employees that describes the life history and species protection measures that are in effect to avoid impacts to burrowing owls. Construction monitoring will also occur throughout the duration of ground-disturbing construction activities to ensure no impacts occur to burrowing owl.

- Construction exclusion areas shall be established around the occupied burrows in which no disturbance shall be allowed to occur while the burrows are occupied. Buffer areas shall be determined by a qualified biologist based on the recommendations outlined in the most recent *Staff Report on Burrowing Owl Mitigation* (CDFW 2012).

- If occupied burrows cannot be avoided, a qualified biologist shall develop and implement a Burrowing Owl Management Plan.

BIO-5. Prior to commencement of project activities, a qualified biologist shall conduct a USFWS-approved "early evaluation" of the project area to determine if the project sites represent San Joaquin kit fox habitat. If the evaluation shows that the San Joaquin kit fox does not utilize the project sites, and the project will not result in take, then no further mitigation shall be required for this endangered species. If the "early evaluation" finds the presence of kit fox, a San Joaquin kit fox survey shall be conducted by a qualified biologist, in accordance with the most recent USFWS San Joaquin Kit Fox Survey Protocol. If it is determined that the San Joaquin kit fox utilizes the property, then the following measures are required to avoid potential adverse effects to this species:

- The Authority shall determine appropriate project modifications to protect kit fox, including avoidance, minimization, restoration, preservation, or compensation.

- If evidence of active or potentially active San Joaquin kit fox dens is found within the area to be impacted by the proposed project, appropriate compensation for the habitat loss shall be determined and provided.

BIO-6. Prior to commencement of project activities, a qualified biologist shall survey for Tipton kangaroo rat, in accordance with the most USFWS *Survey Protocol for Determining* Presence *of San Joaquin Kangaroo Rats*. If it is determined that Tipton kangaroo rat utilizes the project areas, then the following measures are required to avoid potential adverse effects to this species:

- The Authority shall have a qualified biologist conduct trapping to determine if there is a presence of the Tipton kangaroo rat.

- If there is presence, the Authority shall determine appropriate project modifications to protect Tipton kangaroo rat, including avoidance, minimization, restoration, preservation, or compensation.

BIO-7. Prior to commencement of project activities, a qualified biologist shall survey for Nelson's antelope squirrel. If it is determined that Nelson's antelope squirrel is detected on the project areas, then the following measures are required to avoid potential adverse effects to this species:

- The Authority shall determine appropriate project modifications to protect Nelson's antelope squirrel, including avoidance, minimization, restoration, preservation, or compensation.

BIO-8. Prior to commencement of project activities, a qualified biologist shall survey for American badger. Though there isn't a specific survey protocol for this species, American badger share similar habitat as burrowing owl and San Joaquin kit fox. Surveys shall be conducted for American badger concurrently with either burrowing owl or San Joaquin kit fox. If it is determined that American badger are detected on the project areas, then the following measures are required to avoid potential adverse effects to this species:

- The Authority shall determine appropriate project modifications to protect American badger, including avoidance, minimization, restoration, preservation, or compensation.

BIO-9. Prior to the start of construction activities that could affect special-status plant species, a qualified botanist shall conduct a focused survey within the Conveyance Facilities project area for California jewelflower, Hoover's eriastrum, Kern mallow, recurved larkspur, San Joaquin woollythreads, slough thistle, and subtle orache. Focused rare plant surveys shall occur during the typical blooming periods of special-status plants with the potential to occur. If a special-status plant species is found to be present, and avoidance of the species and/or habitat is not feasible, the Authority shall prepare and implement a Revegetation/Restoration Mitigation Plan. The Revegetation/Restoration Mitigation Plan will guide activities during construction and operations and maintenance to avoid and minimize impacts to special-status plant species.

Significance Determination

Less than Significant Impact with Mitigation

Operations and Maintenance

Reptiles, Birds, Mammals, and Plants. In addition to construction activities, activities associated with operations and maintenance could also pose a significant impact to special-status wildlife and plant species. Potential operations and maintenance impacts include; but are not limited to: vehicle collisions with special-status wildlife species on access roads or vehicle trampling over special-status plant species or sensitive natural communities during facility maintenance. Implementation of **Mitigation Measure BIO-10** would reduce impacts associated with operations and maintenance to a less than significant level. Application of pesticides, rodenticides and herbicides is an additional potential operations and maintenance impact that can be detrimental to special-status species, especially smaller special-status species such as Tipton kangaroo rat and Nelson's antelope squirrel. The need for rodenticide use will be reduced by the installation raptor boxes every 0.25 miles of berm with perching structures. Owls and hawks can help to offset harmful effects of burrowing rodents causing damage to earthen berms and the need to use rodenticide to control them. Implementation of **Mitigation Measure BIO-11** would reduce impacts to a less than significant level.

Mitigation Measures

BIO-10: Prior to commencement of project operations and maintenance activities, the Authority shall develop an Operations and Maintenance Plan that details how special-status plant and wildlife species, nesting birds and sensitive natural communities will not be impacted by operations and maintenance activities. Vehicle collisions with special-status wildlife or vehicle trampling of special-status plant species or sensitive natural communities is one example of how operations and maintenance activities could potentially impact biological resources. Some operations and maintenance activities may include pump and facility maintenance and vehicle operation on access roads.

BIO-11. If pesticides will be applied to any areas within the project areas, the Authority shall develop a Pesticide Use Plan that will detail how pesticides, rodenticides, and/or

herbicides will be used and how application will not impact special-status plant and wildlife species, nesting birds, wetlands and jurisdictional features, and sensitive natural communities.

Significance Determination

Less than Significant Impact with Mitigation

Fishery Ecosystem and Special-Status Fish

The fishery ecosystem and special-status fish species associated with the Sacramento-San Joaquin River Delta (Delta) could be beneficially affected by habitat modifications during operations of the proposed project. The California Water Commission (CWC) has administered the Water Storage Investment Program (WSIP) to fund public benefits of eight water storage projects, one of them being the Kern Fan Groundwater Storage Project (CWC 2020). The WSIP identifies 16 priorities for ecosystem benefits to the fishery ecosystem. These 16 ecosystem benefits include:

- Priority 1: Provide cold water at times and locations to increase the survival of salmonid eggs and fry.
- Priority 2: Provide flows to improve habitat conditions for in-river rearing and downstream migration of juvenile salmonids.
- Priority 3: Maintain flows and appropriate ramping rates at times and locations that will minimize dewatering of salmonid redds and prevent stranding of juvenile salmonids in side channel habitat.
- Priority 4: Improve ecosystem water quality.
- Priority 5: Provide flows that increase dissolved oxygen and lower water temperatures to support anadromous fish passage.
- Priority 6: Increase attraction flows during upstream migration to reduce straying of anadromous species into non-natal tributaries.
- Priority 7: Increase Delta outflow to provide low salinity habitat for Delta smelt, longfin smelt, and other estuarine fishes in the Delta, Suisun Bay, and Suisun Marsh.
- Priority 8: Maintain or restore groundwater and surface water interconnection to support instream benefits and groundwater dependent ecosystems.
- Priority 9: Enhance flow regimes or groundwater conditions to improve the quantity and quality of riparian and floodplain habitats for aquatic and terrestrial species.
- Priority 10: Enhance the frequency, magnitude, and duration of floodplain inundation to enhance primary and secondary productivity and the growth and survival of fish.
- Priority 11: Enhance the temporal and spatial distribution and diversity of habitats to support all life stages of fish and wildlife species.
- Priority 12: Enhance access to fish spawning, rearing, and holding habitat by eliminating barriers to migration.

- Priority 13: Remediate unscreened or poorly screened diversions to reduce entrainment of fish.
- Priority 14: Provide water to enhance seasonal wetlands, permanent wetlands, and riparian habitat for aquatic and terrestrial species on State and federal wildlife refuges and on other public and private lands.
- Priority 15: Develop and implement invasive species management plans utilizing techniques that are supported by best available science to enhance habitat and increase the survival of native species.
- Priority 16: Enhance habitat for native species that have commercial, recreational, scientific, or educational uses.

Ecosystem Priority 2 and 12 are the primary beneficiaries of an April flow pulse on the Feather River (CFS 2020). Both priorities seek to enhance the access to spawning grounds and flows to improve habitat conditions for in-river rearing and downstream migration of juvenile salmonids, respectively. Species that would see these benefits to their migration and spawning patterns include Central Valley juvenile spring-run Chinook salmon (*Oncorhynchus tshawytscha*), Central Valley juvenile winter-run Chinook salmon, juvenile steelhead (*Oncorhynchus mykiss*), and green sturgeon (*Acipenser medirostris*).

Cramer Fish Sciences (CFS) consulted with MBK Engineers and IRWD to determine how an additional water supply of 18,000 acre-feet (AF) made available by the proposed project could be used to provide the greatest benefit to ecosystem priorities for fisheries. Monthly flow data (1922 through 2003) representing two future conditions (2030 and 2070) and two scenarios (Project and no project) were provided by MBK Engineers. A total of four different CALSIM[1] scenarios were analyzed. Under existing conditions, the Feather River's baseflow is less than 3,000 cfs in dry years and could be as low as 1,000 cfs (the minimum flow required). CFS recommended a pulse released from Lake Oroville in the month of April, which would occur in dry or critically dry years.

Lake Oroville, a reservoir located in Butte County, California, is a very important fixture within the SWP. The reservoir, impounding the Feather River, stores water for the state of California, provides flood control, recreation, protects fish and wildlife, and assists in freshwater releases controlling salinity intrusion of the Delta (USGS 2013). The Thermalito Afterbay is an off-stream reservoir that provides storage for the water required by the pumpback operation to Lake Oroville, helps regulate the power system, produces controlled flow in the Feather River downstream from the Oroville-Thermalito facilities, and provides recreation. It also serves as a warming basin for agricultural water delivered to farms east of the Thermalito Afterbay (NCWA 2020). The Thermalito Afterbay Outlet (TAO) is an outlet pipe that releases water from Thermalito Afterbay to the Feather River.

CFS assumed the 18,000 AF would be applied as a 3.75 day, 2,400 cfs increase in Feather River flows released from the TAO. Releasing this water from the TAO is important because the

[1] CALSIM is a water resources planning model that simulates operations of the SWP and the Central Valley Project and much of the water resources infrastructure in the Central Valley and the Delta.

Feather River downstream of TAO has no ramping criteria for flows greater than 2,500 cfs (CFS 2020, NMFS 2016a). CALSIM analysis indicated the proposed project could provide April flow pulses (18,000 AF) for seven dry or critically dry years under 2030 future condition, and for five dry years under 2070 future condition (CFS 2020). Flow pulses produced by the proposed project occurred exclusively in dry years, with Feather River base flows at less than 3,000 cfs.

CFS's quantitative analysis focused on the benefits to outmigrating juvenile spring-run and winter-run Chinook salmon. The Feather River supports both natural and hatchery origin spring-run Chinook salmon. The National Marine Fisheries Service (NMFS) considers Feather River spring-run Chinook salmon as part of the listed Central Valley spring-run Chinook Salmon Evolutionary Significant Unit (ESU) (CFS 2020, NMFS 2018b). The estimated monthly number of hatchery origin spring-run smolts (the stage when a young salmonid migrates from freshwater to the ocean) entering the Sacramento River, the estimated monthly number of natural origin spring-runs smolts entering the Sacramento River from the Feather River, and the survival for both hatchery and natural origin smolts are modeled as a function of monthly Feather River flows provided from CALSIM by MBK Engineers (CFS 2020).

While winter-run Chinook salmon do not occur in the Feather River, a flow pulse that reaches the Sacramento River has the potential to benefit juvenile winter-run chinook during outmigration downstream of the Feather River and through the Delta.

Survival rates for migrating juvenile Chinook salmon from the Sacramento River to San Francisco Bay were estimated using the Delta Passage Model (DPM) with four different CALSIM flow scenarios (CFS 2020, CWF 2016). The DPM was developed by CFS to integrate study findings related to how water project operations influence the survival of juvenile Chinook salmon. Although the DPM is based primarily on studies of winter-run Chinook salmon smolt surrogates (late fall–run Chinook salmon), it was applied for this analysis to winter-run and spring-run Chinook salmon by adjusting emigration timing and assuming that all migrating Chinook salmon smolts will respond similarly to Delta conditions.

Benefits for Chinook salmon would occur in years when the proposed project allows for a Feather River flow pulse. On average, proposed project flow pulses were estimated to improve survival relative to the base flow condition by approximately 4.6%. For spring-run Chinook salmon, years with flow pulses would produce 121 to 354 additional adult Chinook salmon from each of the seven proposed project flow pulses occurring in the 2030 estimated condition, and 168 to 375 additional adults for each of the five flow pulses occurring in the 2070 estimated condition. For winter-run Chinook salmon, benefits would range from 26 to 57 additional adult Chinook winter-run occurring with the seven pulses for the 2030 condition, and with the five pulses for the 2070 estimated condition. Losses due to Delta diversions could occur for both spring-run and winter-run Chinook salmon, but these losses would be outweighed by larger benefits which accumulate across all years.

For green sturgeon, April pulse flows would be expected to enhance upstream passage for spawning adults. Assuming that the Feather River has sufficient habitat to accommodate an increased spawning population (currently 25 or fewer spawners) similar to the Sacramento River

spawning population (364 spawners), the annualized benefit attributable to the proposed project would be approximately 13 and 10 adult additional spawners accessing the Feather River per year for the 2030 and 2070 future conditions.

For steelhead, an additional 63 to 127 adults would be benefited for the 2030 future condition and an additional 42 to 83 adults would be benefited for the 2070 future condition.

Mitigation Measures

None Required

Significance Determination

Beneficial Impact

Waterfowl and Migratory Birds

Waterfowl and migratory birds could be beneficially affected by habitat modifications during operations and maintenance of the proposed project. The proposed project is situated within the Pacific Flyway, a major north-south flyway for migratory birds in America, extending from Alaska to Patagonia. Each year, a billion birds migrate along the Pacific Flyway. Habitat loss, water shortages, diminishing food sources, and climate change all threaten birds that use the Pacific Flyway (National Audubon Society 2020).

The recharge basins that would be created as a result of the proposed project will be designed to establish intermittent wetland habitat through intermittent recharge events. The intermittent wetland habitat can support waterfowl, shorebirds, raptors and other migratory birds along the Pacific Flyway. The nearby recharge basins at the Kern Water Bank are re-establishing a thriving intermittent wetland habitat along the recharge basins, where marsh-like environments are established during recharge periods and create ideal habitat for waterfowl, shorebirds, raptors, and other native and migrating birds (KWBA 2020).

Willow (*Salix* sp.), cottonwood (*Populus* sp.), sedge (*Carex* sp.) and other wetland vegetation have re-emerged along the edges of the Kern Water Bank recharge basins and earthen canals. These protected areas provide critical nesting and foraging habitat for more than 40 species of waterfowl and other birds (KWBA 2020). Some of these species include but are not limited to: Caspian tern (*Hydroprogne caspia*), double-crested cormorant (*Phalacrocorax auritus*), American white pelican (*Pelecanus erythrorhynchos*), and tri-colored blackbird.

The Kern Audubon Society conducts bird counts often to educate, inform and study trends and migration of waterfowl species, as well as common bird species. In 2009, the Kern Audubon Society conducted a three-day survey at the Kern River Preserve and detected 246 different species of birds, many of which were waterfowl and/or migratory birds (Kern Audubon Society 2010). Some of these species include: American widgeon (*Mareca Americana*), gadwall (*Mareca strepera*), snow goose (*Chen caerulescens*), Canada goose (*Branta Canadensis*), and cinnamon teal (*Anas cyanoptera*). Needless to say, migratory waterfowl and resident species will seek to use the recharge basins as grounds for resting, foraging and breeding. Other waterbodies in the

vicinity of the proposed project that migratory waterfowl use include Lake Buena Vista, Kern National Wildlife Refuge, Pixley National Wildlife Refuge, Kern River, Kern River Preserve, Tule Elk State Reserve, and Lokern Ecological Reserve.

Mitigation Measures

None Required

Significance Determination

Beneficial Impact

Sensitive Natural Communities

Impact 3.4-2: The proposed project could have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or USFWS. (*Less than Significant Impact with Mitigation)*

Construction

No sensitive natural communities were observed within the Phase 1 or Phase 2 project areas; however, the Conveyance Facilities project area contains five sensitive natural communities, all with an S3 ranking. These sensitive natural communities include: Bush seepweed scrub - *Suaeda moquinii* Shrubland Alliance and Goodding's willow - *Salix gooddingii* Forest & Woodland Alliance, Red willow - *Salix laevigata* Woodland and Forest Alliance, Iodine brush scrub - *Allenrolfea occidentalis* Shrubland Alliance, and Mesquite thickets - *Prosopis glandulosa* - *Prosopis velutina* - *Prosopis pubescens* Woodland Alliance. If construction impacts are anticipated to effect any sensitive natural communities, Implementation of **Mitigation Measure BIO-12** would reduce impacts to a less than significant level.

Operations and Maintenance

In addition to construction activities, activities associated with operations and maintenance activities could also pose a significant impact to sensitive natural communities. Potential operations and maintenance impacts include, but are not limited to, vehicle trampling over sensitive natural communities. Implementation of Mitigation Measure BIO-10 would reduce impacts associated with operations and maintenance to a less than significant level. Application of pesticides, rodenticides and herbicides is an additional potential operations and maintenance impact that can effect sensitive natural communities. Implementation of Mitigation Measure BIO-11 would reduce impacts to a less than significant level.

Mitigation Measures

> **BIO-12**. If sensitive natural communities will be impacted from construction activities, a focused survey by a qualified botanist shall be conducted to assess and delineate the potential impacts. If evidence of impacts to these sensitive natural communities are observed or anticipated, compensation for the habitat loss shall be provided.

Implement Mitigation Measures BIO-10 and BIO-11 during project operation and maintenance.

Significance Determination

Less than Significant with Mitigation

Wetlands

Impact 3.4-3: The proposed project could 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. (*Less than Significant Impact with Mitigation)*

Construction

There are potentially wetlands and jurisdictional features in the project areas that may be impacted by habitat modification during construction. The hydrophytic vegetation within the Rosedale West Intake Canal is being maintained only by a man-made source of water and hydrology. Should the sources of water (i.e., irrigation for crops) be terminated, the vegetation would no longer exist and, therefore the areas are not considered wetlands. The canal is a man-made water supply conveyance facility and thus is not considered Waters of the United States or Waters of the State. This feature would not be considered under the jurisdiction of (or subject to regulation by) the USACE (per Section 404 of the *CWA*), CDFW (per Section 1600 of the *Fish and Game Code*), or the RWQCB (per Section 401 of the *CWA*). The riparian vegetation and conditions found in Goose Lake Channel and on the Conveyance Facilities project area could potentially meet the requirements of a wetland as defined by the USACE and RWQCB. Goose Lake Channel may be considered waters of the U.S. and/or waters of the State since it demonstrates upstream connectivity with the Kern River, a Relatively Permanent Water. However, the hydrology of the channel is completely controlled through a weir that diverts water from the Kern River; thus, the channel is operated in a manner similar to other irrigation canals in and surrounding the project area that are not considered jurisdictional features. Connecting the Kern Fan Conveyance Facilities to the Goose Lake Channel may result in potential impacts to a potentially jurisdictional feature, depending on the methods and degree of impact during construction. Implementation of **Mitigation Measure BIO-13** would reduce potential impacts to a less than significant level by requiring a jurisdictional delineation to be prepared for project facilities with potential to affect jurisdictional resources, and if jurisdictional features are identified, requiring mitigation and compensation requirements to be implemented prior to construction. If wetlands are present on-site, Authority would be required to obtain a Section 404 Permit from the USACE, Section 401 from the Regional Water Quality Control Board and a 1602 Streambed Alteration Agreement from the California Department of Fish and Wildlife or written documentation that one is not required.

Operations and Maintenance

Wetlands resources could be beneficially affected by habitat modifications during operations and maintenance of the proposed project via creation of intermittent wetlands. The recharge basin

design is intended to create intermittent wetlands and bird habitat. Per the recommendation of the Environmental Defense Fund (IRWD 2020), recharge basins would be constructed at multiple water depths to benefit both shorebirds and waterfowl. Shorebirds prefer mudflats to a depth of up to 6" with sparse vegetation (<40%) while waterfowl prefer depths of 6" to above 18" with a combination of open water and wetland cover and dry land (berms or islands) are important for resting areas with dense vegetation (IRWD 2020). The basins will be leased for grazing or farming when they are not used for recharge.

Mitigation Measures

BIO-13. Prior to any disturbance of potential jurisdictional resources within the project areas, a jurisdictional delineation of water courses shall be conducted for the purposes of identifying features or habitats that would be impacted by project activities and subject to the jurisdiction of the USACE, RWQCB, and CDFW. The findings shall be included in a jurisdictional delineation report suitable for submittal to these agencies for obtaining a Section 404 permit and/or CDFW Streambed Alteration Agreement.

Prior to project activities that would result in the discharge of fill or dredged material within waters of the U.S., a Section 404 CWA permit shall be obtained from the USACE and a Section 401 Water Quality Certification shall be obtained from the RWQCB. Prior to activities within streams, ponds, seeps or riparian habitat, or use of material from a streambed, the project applicant shall obtain Waste Discharge Requirements for impacts to waters not subject to the CWA, provide written notification to CDFW pursuant to Section 1602 of the Fish and Game Code, ensure the notification is complete as provided in Section 1602, and comply with the terms of conditions of any agreement CDFW may issue in response to the notification.

Significance Determination

Less than Significant Impact with Mitigation (project construction)

Beneficial Impact (project operation and maintenance)

Migratory Wildlife Corridors

Impact 3.4-4: The proposed project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (*Less than Significant Impact*)

Construction, Operations and Maintenance

The project areas boast several wildlife movement corridors; including the Pacific Flyway, Goose Lake Channel and Kern Water Bank. All three of the wildlife movement corridors could support special-status species with a medium or high potential to occur, as well as the three additional special-status species detected during the reconnaissance. The Kern Water Bank (within the Conveyance Facilities project area) connects to the southern areas of the Phase 1 and Phase 2 project areas, and thus linkage value is deemed high quality; however, the proposed project is not

anticipated to affect the continued movement of any fish or wildlife species. No impact would occur, and no mitigation measures are required.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Local Policies and Ordinances

Impact 3.4-5: The proposed project could conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (*Less than Significant Impact with Mitigation)*

Construction, Operations and Maintenance

There are local policies or ordinance that protect biological resources with which the proposed project has the potential to conflict. The proposed project is within the jurisdiction of the Kern County General Plan and the Metropolitan Bakersfield General Plan. Several biological resource ordinances and policies are required for implementation to protect special-status species. Implementation of Mitigation Measures BIO-1 through BIO-9, BIO-12, and BIO-13, would cover protecting the ordinances and policies implemented in the Kern County General Plan and the Metropolitan Bakersfield General Plan during project construction. Implementation of Mitigation Measures BIO-10 and BIO-11 would reduce impacts to a less than significant level, regarding operations and maintenance activities

Mitigation Measures

Implement Mitigation Measures BIO-1 through BIO-9, BIO-12, and BIO-13 during project construction.

Implement Mitigation Measures BIO-10 and BIO-11 during project operations and maintenance.

Significance Determination

Less than Significant Impact with Mitigation

HCP and NCCP

Impact 3.4-6: The proposed project could conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. (*Less than Significant Impact with Mitigation)*

Construction, Operations and Maintenance

The proposed project has the potential to conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or

state habitat conservation plan. Approximately 60% of the Phase 1 project area falls within the MBHCP area. The MBHCP's primary focus is on lands converted to urban uses (MBHCP 1994, ESA 2013). The MBHCP sets forth a program for the preservation and protection of habitat for several rare or endangered species found in the HCP area in exchange for the loss of some existing habitat from urban development. The MBHCP permit only applies to City or County actions, or actions by others, which involve City or County permits. Special agencies, such as Rosedale and the Authority, that are exempt from local permitting have other options with regard to endangered species issues, including resolving endangered species issues directly with USFWS and CDFW (MBHCP 1994, ESA 2013). The proposed project would not result in the conversion of land to urban uses. There would be no impact to the MBHCP.

The Kern Water Bank HCP/NCCP is a plan to accomplish both water conservation and environmental objectives. The primary water conservation objective is the storage of water in aquifers during times of surplus for later recovery during times of shortage (KWBA 1997). In addition, conservation areas are established within the HCP/NCCP area. If located within the Kern Water Bank HCP/NCCP, the proposed project could result in adverse habitat modifications or vehicle collisions to sensitive species in the HCP/NCCP area. Implementation of Mitigation Measures BIO-10, BIO-11, and **BIO-14** would ensure that the proposed project does not adversely impact biological resource mitigation within the HCP/NCCP.

Mitigation Measures

Implement Mitigation Measures BIO-10 and BIO-11 during project operation and maintenance.

BIO-14. Should facilities be located on the Kern Water Bank, the Authority shall initiate discussions with the Kern Water Bank Authority to ensure Conveyance Facilities located in the Kern Water Bank HCP/NCCP avoid impacts to covered species within the HCP/NCCP area during construction, operations, and maintenance.

Significance Determination

Less than Significant Impact with Mitigation

Cumulative Impacts

Impact 3.4-7: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to biological resources. (*Less than Significant Impact with Mitigation)*

This section presents an analysis of the cumulative effects of the proposed project in combination with other present and reasonably foreseeable future projects that contribute to cumulatively considerable impacts to biological resources. As summarized in Table 3-2 of Chapter 3 of this Draft EIR, there are cumulative projects that are located in the project area and could contribute to cumulatively considerable impacts to biological resources. The cumulative projects include groundwater storage and recharge facilities, water conveyance infrastructure, and transportation projects.

The environmental setting, biological resources, and impact mechanisms must be taken into account when evaluating the cumulative impacts on biological resources. The existing environmental setting is already largely developed with remnant native and non-native vegetation communities. The cumulative projects are occurring a matrix of developed land cover types—agriculture, urban, and recharge basins—with both patches and larger areas of native and non-native vegetation communities. This environmental setting maintains suitable habitat for special-status species and natural communities; however, the much of the habitat is already degraded. As described above, there are a number of special-status species, both plants and wildlife, that currently utilize the project area and surrounding vicinity. Those special-status species that persist have adapted to use developed land cover types as habitat or continue to persist in the remnant native and non-native vegetation communities.

The groundwater banking and recovery projects are located in existing agricultural lands which may include remnant native and nonnative vegetation communities. The transportation projects fall within the MBHCP area. This area has a similar composition, but with urban development being the dominate land use type.

Construction

It is anticipated that most of the cumulative project impacts from construction will occur in agricultural and urban lands. The cumulative projects impact mechanisms for the groundwater banking and recovery projects would be similar to the proposed project if they occur in suitable habitat for special status wildlife and plants or sensitive natural communities. The roadway projects within the City of Bakersfield and would require compliance with the MBHCP. Their impacts to biological resources would be mitigated or avoided and minimized in accordance with the MBHCP. Based on the review of the projects contributing to cumulative effects, it is anticipated that the proposed project would not have effect that are cumulatively considerable with implementation of Mitigation Measures BIO-1 through BIO-9 and BIO-12 and BIO-14. Cumulative impacts would be less than significant with mitigation.

Operations and Maintenance

It is anticipated that cumulative project impacts from operations and maintenance from the groundwater banking and recovery projects would be similar to the proposed project. The impacts could be evaluated as beneficial (e.g., seasonal aquatic features) or neutral (e.g., maintenance of agricultural practice when not in use for recharge) for project components implemented in agricultural lands. The cumulative projects impact mechanisms for the groundwater banking and recovery project operations and maintenance would be similar to the proposed project if they occur in suitable habitat for special status wildlife and plants or sensitive natural communities. Similar to construction, the roadway projects within the City of Bakersfield and would require compliance with the MBHCP. Their impacts to biological resources would be mitigated or avoided and minimized in accordance with the MBHCP. Based on the review of the projects contributing to cumulative effects (those projects covered by the MBHCP plus the proposed project), it is anticipated that the proposed project would not have effects that are cumulatively considerable with implementation of Mitigation Measures BIO-10 through BIO-14. Cumulative impacts would be less than significant with mitigation.

Mitigation Measures

Implement Mitigation Measures BIO-1 through BIO-14.

Significance Determination

Less than Significant Impact with Mitigation

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3.5 Cultural Resources

This section describes and evaluates potential impacts related to cultural resources that could result from construction and operation of the proposed project. The section contains: a description of the existing environmental setting as it pertains to cultural resources; a summary of the regulations related to cultural resources; and an evaluation of the potential impacts related to cultural resources associated with the implementation of the proposed project, including cumulative impacts. The cultural resources described in this section are based on the findings provided on the report *Kern Fan Groundwater Storage Project Cultural Resources Assessment Report* (Ehringer et al. 2020).

3.5.1 Environmental Setting

Natural Setting

The proposed project is located in the southern San Joaquin Valley, within California's Central Valley, which extends from the Siskiyou Mountains in the north to the Tehachapi Mountains in the south and covers an area 450 miles long and 250 miles wide. The Central Valley is bound by the Cascade Ranges and Sierra Nevada Mountains in the east and the Coast Ranges in the west.

Historically, the valley supported a treeless plain with patches of alkali-tolerant annual forbs and grasses (Fagan 2003; Rosenthal et al. 2007). Dominant vegetation in the wetlands consisted of large growths of tules. In drier spots, sage, greasewood, and bunchgrass flourished. Trees, such as cottonwoods, sycamores, and willows, lined river channels and sloughs, but were absent from the valley floor (Wallace 1978a). The wetlands supported a huge number of aquatic fowl, including migratory ducks and geese, abundant fish, turtles, and freshwater mussels. Antelope, deer, and elk wintered on the plains. Other wildlife included jackrabbits, ground squirrels, and quail (Wallace 1978a).

The Kern River naturally carries snowmelt south through Bakersfield out of the Sierra Nevada. Due largely to the negligible gradient across the valley floor, in the past, water from the Kern River tended to exhibit a distributary pattern at lower elevations, splitting into smaller channels (ECORP 2007). These distributaries created a network of sloughs (Goose Lake Slough, Buena Vista Lake Slough), streams, marshes, and shallow lakes. Water tended to collect in Goose Lake, Kern Lake, and Buena Vista Lake. Buena Vista Lake, located about 5 miles south of the project area, was the most seasonally stable lake. During overflow conditions, water flowed from Kern and Buena Vista Lakes along Buena Vista Slough towards Tulare Lake (ECORP 2007). The environment of the sloughs and surrounding areas would have been intermittently to seasonally inundated, creating marshy/swampy conditions that would have provided important resources, such as tules, cat-tail, and sedges, as well as animal habitat. Diversion of the Kern and channelization (canalization) of distributary streams and sloughs since the end of the 19th century, as well as construction of Lake Isabella Dam in 1953, has significantly altered the hydrology and natural setting of the area, resulting in more arid conditions than would have existed at certain times prehistorically.

The southern San Joaquin Valley is characterized by a surface geology consisting of young (Holocene-age) alluvium and flood basin deposits (DWR 2003). These consist of interstratified and discontinuous beds of clay, silt, sand, and gravel, and are approximately 150 feet thick at the margins of the valley. These younger deposits overlie older alluvium.

Prehistoric Setting

The Central Valley prehistoric record is divided into three basic periods: Paleo-Indian (11,550 to 8,550 cal B.C.), Archaic (8,550 cal B.C. to cal A.D. 1100), and Emergent (cal A.D. 1100 to Historic). The Archaic period is further divided into three sub-periods: Lower Archaic (8,550 to 5,550 cal B.C.), Middle Archaic (5,550 to 550 cal B.C.), and Upper Archaic (550 cal B.C. to cal A.D. 1100) (Rosenthal et al. 2007).

Paleo-Indian (11,550 to 8,550 cal B.C.)

Evidence of human occupation of the Central Valley during the Paleo-Indian period comes primarily from the San Joaquin Valley. Basally thinned and fluted concave base projectile points, similar to Clovis points, have been found in three San Joaquin Valley areas: Tracy Lake, the Woolfsen mound, and the Tulare Lake basin. The Witt site (CA-KIN-32), located on a Late Pleistocene shoreline of Tulare Lake, produced hundreds of these points (Rosenthal et al. 2007). Human and faunal bone recovered from this site dated to between 10,788 and 17,745 uncalibrated radiocarbon years before present; however, there is no direct association between the projectile points and the bone. Little other evidence of human occupation during the Paleo-Indian period is available for the Central Valley.

Lower Archaic (8,550 to 5,550 cal B.C.)

Lower Archaic occupation of the Central Valley is known mainly from isolated finds located along the ancient shorelines of lakes. Stemmed points, chipped stone crescents, and other flaked stone artifacts are frequently recovered from the ancient shorelines of Tulare Lake, though an isolated flaked stone crescent was recovered from an ancient alluvial fan west of Orland in the Sacramento Valley (Rosenthal et al. 2007). Archaeological evidence from the valley floor and adjacent foothill areas suggest two distinct cultural adaptations, though degree of variation and interaction between valley floor and foothill groups is presently unknown; these variations may not represent divergent adaptations, but rather seasonal expressions of the same group (Rosenthal et al. 2007).

Very little archaeological evidence exists for occupation of the valley floor during the Lower Archaic. One component from site CA-KER-116 was dated to between 7,175 and 6,450 cal B.C. based on radiocarbon assays obtained from freshwater mussels. This site is located on the ancient shoreline of Buena Vista Lake, between Bakersfield and Taft (Rosenthal et al. 2007). The artifact assemblage from CA-KER-116 included chipped stone crescents, a stemmed projectile point fragment, a carved stone atlatl spur, and some flaked stone tools. Faunal bone included freshwater fish, waterfowl, freshwater mussel, and artiodactyl. No plant remains or milling tools were recovered (Rosenthal et al. 2007). While regional trade of marine shell beads and obsidian is well documented for other areas during this time, Lower Archaic deposits from CA-KER-116 do not contain beads or obsidian.

In contrast to the valley floor, ground stone tools indicative of plant processing, such as handstones and millingslabs, are common in adjacent foothill sites (Rosenthal et al. 2007). These sites appear to have been seasonally exploited, with nuts, such as acorn and pine, consumed more than small seeds. Artifact assemblages suggest a semi-permanent settlement system with rotating occupation of seasonal camps.

Middle Archaic (5,550 to 550 cal B.C.)

The Middle Archaic is characterized by a climatic shift to warmer, drier conditions, similar to present-day conditions. This change was likely the primary impetus for culture change throughout California. In the Central Valley, Tulare Lake receded as the Sacramento-San Joaquin Delta wetland habitat developed.

By the Middle Archaic, foothill and valley floor groups were distinct and separate adaptations. Early sites from the Middle Archaic period are more abundant in the foothill areas and are characterized by a large quantity of stone implements designed to exploit acorns and pine nuts. Projectile points are typically composed from locally available materials and include notched, stemmed, thick-leaf, and narrow concave base darts. There is a lack of bone and shell artifacts (Rosenthal et al. 2007).

Valley floor groups are better represented in sites dating from the later Middle Archaic period and reflect an increasing exploitation of river corridors in the Sacramento and San Joaquin valleys. Sites were occupied year round and technological assemblages suggest a growing reliance on fishing. Gorge hooks, composite bone hooks, and spears all appear in the archaeological record during the Middle Archaic. Tule elk, mule deer, pronghorn sheep, rabbits, and waterfowl are also represented in faunal assemblages and indicate exploitation of freshwater marshes, riparian forests, and grasslands. Mortars and pestles appear around 4,050 cal B.C.; however, acorn and pine nut remains are also commonly recovered from sites lacking mortars and pestles (Rosenthal et al. 2007).

Middle Archaic northern San Joaquin Valley and southern Sacramento Valley sites include artifacts more common to later time periods elsewhere, including fine-twisted cordage, twined basketry, basketry awls, simple pottery, and baked clay objects (Rosenthal et al. 2007). Items of personal adornment, such as stone plummets, bird bone tubes, and shell beads, are also present in Middle Archaic deposits (Rosenthal et al. 2007).

Regional trade was widespread during the Middle Archaic, as evidenced by obsidian and shell beads and ornaments commonly recovered from sites. The earliest appearance of *Olivella* grooved-rectangle beads is in the southern San Joaquin Valley (at sites CA-KER-3166/H and CA-KER-5404) and generally date to 3,050 cal B.C. or earlier (Rosenthal et al. 2007). Settlement patterns reflect more stable, long-term occupation of resource-abundant areas.

The Middle Archaic period is typified by the Widmiller Pattern, first identified in the Sacramento-San Joaquin delta region. In the Central Valley, Windmiller sites generally date to between 1,850 and 750 cal B.C. These sites, found as far south as Buena Vista Lake in the San Joaquin Valley, are characterized by westerly oriented, ventrally and dorsally extended burials

and complex grave offerings (Rosenthal et al. 2007). During this period, Windmiller cemeteries exhibit not only a distinct burial pattern, but evidence of resource depletion and increased interpersonal violence. Osteological studies reveal higher levels of malnutrition and skeletal trauma, such as fractures and embedded stone points (Fagan 2003).

Upper Archaic (550 cal B.C. to cal A.D. 1100)

Climatic changes at the start of the Upper Archaic resulted in a cooler, wetter, and more stable environment. During the Upper Archaic period, regional variations were more common and focused on resources that could be processed in bulk, such as acorns, salmon, shellfish, rabbits, and deer. Polished and ground stone plummets, sometimes recovered as caches, are commonly recovered from riparian environments and marshlands in the delta and southern San Joaquin Valley. Use of mortars and pestles for food processing was prevalent, except for the valley margins where handstones and millingslabs remained dominant (Rosenthal et al. 2007).

Shell bead trade and technological specialization increased. Shell bead types include saucer and saddle-shaped *Olivella* beads. Bone wands, tubes, and ornaments, as well as well-made ceremonial obsidian blades, appear in the archaeological record at this time. In San Joaquin Valley, obsidian biface blanks were imported via east-west travel corridors from eastern Sierra Nevada Mountains quarries, including Bodie Hills, Casa Diablo, and Coso. Lanceolate-shaped bifaces were produced by specialized craftsman located near northern obsidian sources, which were widely traded throughout the Central Valley (Rosenthal et al. 2007).

The delta region of the lower Sacramento Valley saw the rise of large mounded villages characterized by extensive habitation deposits with fire-cracked rock, hearths, ovens, house floors, and flexed burials. This adaptation is known as the Berkeley Pattern. However, descendants of the Windmiller Pattern remained in the San Joaquin Valley during this time period. Upper Archaic Windmiller sites in the San Joaquin Valley are generally located along the western and southern margins of the delta, as well as near streams and marshes (Rosenthal et al. 2007). Excavated cemeteries located along the western fringes of the San Joaquin Valley contained either flexed or extended burials, and may reflect alternating occupation of this area by valley and coastal range groups.

Sites around Buena Vista Lake in the southern San Joaquin Valley reflect year-round occupation of villages and include house floors and extensive middens. House floors appear in the archaeological record as large, round depressions ranging in diameter from 4 to 8 meters and 0.3 to 1 meter in depth. Other indicators of residential dwellings could include hearths, post holes, and underground storage pits (Chartkoff 1998).

Emergent (cal A.D. 1000 to Historic)

During the Emergent Period, many Archaic Period technologies and cultural traditions disappeared throughout the Central Valley. Practices very similar to those observed by later European explorers appeared at this time. Research on Emergent Period sites in the San Joaquin Valley has been limited and only one cultural pattern, the Panoche Complex, has been fully identified. The Panoche Complex (circa A.D. 1500 to 1850) is characterized by large circular

structures, flexed burials and cremations, small side-notched projectile points, shell disk beads, and ground stone, such as mortars, pestles, and some metates (Moratto 1984).

The Emergent Period is often divided into the Lower Emergent (A.D. 500-1500) and Upper Emergent (A.D. 1500-1800). The Lower Emergent Period is characterized by banjo-type *Haliotis* ornaments, incised bird bone whistles and tubes, flanged soapstone pipes, and rectangular *Olivella* sequin beads. The bow and arrow replaced the dart and atlatl in hunting tool kits. Panoche side-notched points, a variation on the Desert side-notched point, have been recovered from Lower Emergent Period sites along the western side of the San Joaquin Valley. The Upper Emergent is characterized by small corner-notched and desert series projectile points, *Olivella* lipped and clam disk beads, bead drills, magnesite cylinders, and hopper mortars. While limited cremation was practiced during the Lower Emergent, it became widespread during the Upper Emergent. In general, increasingly complex burial practices developed, as indicated by grave goods and variation in burial type (Fredrickson 1974; Rosenthal et al. 2007).

By the end of the Emergent Period, village sites and territorial boundaries closely resembling those documented in ethnographic literature had been established. Manufacturing centers were decentralized and raw materials in the form of obsidian cobbles and shell bead blanks were transported from their sources to areas where the finished product would be completed. Trade relations were highly regularized and sophisticated, with increasing quantities of goods moving over greater distances. Clam disk beads became a monetary unit of trade. Individual and groups of specialized craftsman arose governing various aspects of production and exchange throughout California (Fredrickson 1974).

Central Valley sites during this time period exhibit faunal assemblages characterized by large quantities of fish bone and a diversity of bird and mammal bones, with some regional variations. Plant use is represented by the mortar and pestle, though the types of plants exploited in the San Joaquin Valley is not well documented. In the Sacramento Valley, small seeds became an increasingly important staple, as well as acorns, pine nuts, and manzanita. Diverse fishing equipment assemblages are common to the Sacramento Valley and include several types of harpoons, bone fish hooks, and gorge hooks. Twined and coiled basketry and netting have been recovered from several sites in the Central Valley, including CA-MER-3 (the Menjoulet Site) located near Los Banos Creek (Rosenthal et al. 2007).

In the southern San Joaquin Valley, pottery was not manufactured but was obtained by trade with groups from the foothills to the east. Consumnes pottery was produced in the Sacramento Valley and is represented in several artifact assemblages from Sacramento County sites. Other clay items recovered from Sacramento Valley sites include baked clay balls (possibly used for cooking), and human and animal effigies (Rosenthal et al. 2007).

House floors are common throughout the Central Valley during the Emergent Period. A very large house floor, probably representing a ceremonial structure, was documented during excavations at the Menjoulet Site in Merced County. The floor measured 28 meters in diameter with a mud wall around the perimeter. Thirty cremations and two inhumations were recovered from the house floor (Gamble 2012; Moratto 1984).

Ethnographic Setting

At the time of contact, the Central Valley was occupied by speakers of the California Penutian language family, specifically the Yokuts. The Yokuts entered the San Joaquin Valley sometime prior to A.D. 1400, perhaps by force, as indicated by skeletal remains with fatal wounds inflicted by projectile points. Historically, Yokuts have been divided into three cultural-geographical groupings: Northern Valley, Southern Valley, and Foothills (Arkush 1993; Fagan 2003). The proposed project is located within the territory of the Southern Valley Yokuts.

The Southern Valley Yokuts territory included Tulare, Buena Vista, and Kern lakes and the lower portions of the Kings, Kaweah, Tule, and Kern rivers. Yokuts were organized into distinct groups each of which had their own name, dialect, and territory. Each group averaged about 350 persons (Wallace 1978a). Yokuts were uniquely egalitarian in their political organization. Local groups were self-governing and all members received equal ownership and access to most resources (Arkush 1993). The Southern Valley Yokuts established permanent settlements on high ground near larger bodies of water, above flood levels. Housing consisted of small round or oval-shaped structures framed by light wooden poles tied together and topped with tule mats.

Southern Valley Yokuts relied heavily on tule reeds for basketry and making floor mats. Basketry tools, such as awls, were manufactured primarily from large mammal bones. Cordage was constructed from milkweed. Stone was less abundant in the Southern Valley Yokuts territory than in the Northern Valley Yokuts territory and lithic material and milling implements were generally obtained through trade. Other items acquired through trade with neighboring groups include *Olivella* and abalone shells, as well as clam disk monetary beads (Wallace 1978a). The Southern Valley Yokuts used tule to construct watercraft.

Diets consisted mainly of fish, waterfowl, shellfish, roots, and seeds. Preferred fish included lake trout and, when available, steelhead, salmon and sturgeon. Chub, perch, and suckers were less desirable and caught in smaller numbers. Fish were caught by trolling with nets, diving with hand nets, spearing, or capturing fish via basketry traps, with bare hands, or with a bow and arrow. Available waterfowl included geese, ducks, and mud hens. Methods for capturing birds included snares, nets, bow and arrow, and throwing tule mats over their prey. Stuffed decoys were employed to assist in capture. The Yokuts also acquired eggs from nests (Wallace 1978b; Fagan 2003).

Other foodstuffs included freshwater mussels, turtles, wild seeds and roots, which were all consumed in large quantities. Grassnut roots were roasted whole or made into a paste. For the Southern Valley Yokuts, the absence of oak trees in the valley floor meant that acorns were only available by travel or trade. On occasion, wild pigeons, jackrabbits, ground squirrels, and burrowing rodents were acquired. Larger game, such as antelope and elk, were rarely hunted (Wallace 1978a; 1978b).

Historic Setting

Widespread exploration of the Central Valley began in the early 1800s when Lieutenant Gabriel Moraga led a Spanish contingent over Pacheco Pass and into the valley. In the ensuing years,

Moraga made several expeditions into the San Joaquin Valley to scout for potential mission sites and pursue runaway neophytes; however, no permanent Spanish settlements were established in the San Joaquin Valley (CAGenWeb 2013).

One of the earliest Spanish trails, known as El Camino Viejo (The Old Road), ran north-south through the San Joaquin Valley extending from San Pedro to San Antonio (present-day East Oakland). The trail followed the path of a prehistoric trail and skirted the eastern slope of the Coast Range foothills. El Camino Viejo was an alternative route to heavily traveled El Camino Real (The Royal Road) and was often the preferred route of those wishing to travel under the radar of the Spanish government. The trail, called "The Old Trace" by American settlers, became a stagecoach and mail route and also an important route for cattle ranchers. In the valley, the route largely corresponds to modern-day Interstate 5 (Hoover et al. 2002; Preston 1981; Tulare Basin Wildlife Partners 2009).

Mexico gained independence in 1821 and set about secularization of the missions and promoting settlement of Alta California through the issuance of land grants and liberal colonization laws, which did not prevent foreigners from settling in Mexican territory. This allowed for a significant number of Americans to gain a foothold in Alta California. In an attempt to prevent continued foreign incursion and promote a greater Mexican presence in the interior, Mexico issued the 1840 Law of Colonization and encouraged the establishment of cattle ranches in the Central Valley; however, few Mexican land grants were issued in the San Joaquin Valley (Hoover et al. 2002; Preston 1981; Shumway 2007).

In the mid-to-late-1820s, American trappers, including Jedediah Smith, Ewing Young, and Kit Carson, entered to the region in order to hunt fur-bearing animals inhabiting the valley. In 1848, gold was discovered at Sutter's Mill resulting in a large influx of immigrants hoping to make their fortunes. After cessation of the Mexican-American War in the same year, California was ceded to the United States, officially becoming a state in 1850. Mexico's public lands became United States public lands and were surveyed, sectioned, and made available for sale/settlement (BLM 2013; Hoover et al. 2002; Preston 1981; Shumway 2007; State Lands Commission 1982).

With the waning of the mining industry in the mid-1860s, many turned to raising cattle and sheep in the valley, including many Basque and Portuguese immigrants who had been shepherds in their native land (Graves 2004; Miller 2013). The vast prairie grasslands readily supported large herds that required little maintenance. Sheep were primarily herded on the uninhabited west side, feeding on wild alfalfa or rented to stubble land. Sheep ranches often included a shearing barn or shed, feed barn, ranch house, lambing sheds, and corrals. Cattle generally roamed free until they were rounded up and driven to market where they were sold for their meat, hides, and other by-products. A severe drought in 1876-1877 crippled the cattle industry. Many cattle that would have been sold for their meat were slaughtered to save the hide. It was at this same time that dry farming experienced a boost due to mechanization of farm equipment, such as threshers (Caltrans 2007; Vandor 1919).

After the decline of the cattle industry in the 1870s, the grain industry rose to prominence. In 1889, the San Joaquin Valley wheat crop topped 40 million bushels, the largest crop in the United

States except that produced by the entire State of Minnesota. Over the ensuing years a failure to rotate crops depleted the soil and yields decreased. This, coupled with a drop in grain prices and the advancement of irrigation, opened up the opportunity for expansion of viticulture and other horticultural industries (Pisani 1985; Ryan and Breschini 2010; Vandor 1919).

The early 1900s saw the rise of the dairy farmer in the San Joaquin Valley (Caltrans 2007). The decline of the wool industry from the 1880s-1900s left many San Joaquin Valley Portuguese sheepherders unemployed and many turned to the growing dairy industry. By the 1930s, Portuguese dairy farms were well established in the valley (Graves 2004). In the mid-1930s, the Great Depression, drought, and poor economic and agricultural conditions in the southern and plains states led to a mass migration of "Dust Bowl refugees" to California. Approximately 300,000-400,000 migrants from Oklahoma, Texas, Arkansas, Missouri, and other states moved to California, drawn by the promise of employment and a better life (Gregory n.d.). Many ended up in the San Joaquin Valley to work as field hands (Gregory 1989). The migrants were pejoratively referred to as "Okies" and their plight was captured most famously by John Steinbeck in his 1939 book *The Grapes of Wrath*.

Today, a wide variety of agricultural enterprises exist in the San Joaquin Valley, with farms ranging from small to large industrial operations and producing crops such as fruits, nuts, barley, beans, corn, hay, beets, wheat, and cotton. Livestock, including cattle and poultry, is still raised in the San Joaquin Valley (Caltrans 2007).

State Water Project

The California Legislature created a Department of Public Works in 1921. This new entity consisted of five divisions, including a Division of Water Rights, Division of Water Resources (the California Department of Water Resources [DWR]'s predecessor), and a Division of Engineering and Irrigation. The Legislature requested a plan to irrigate the maximum amount of land and provide maximum protection from floods. This was to be a comprehensive water plan for the state which would address conservation, flood control, storage, distribution, and uses. In 1931, a "State Water Plan" report was submitted by the Division of Water Resources to the legislature; this plan would later be known as the Central Valley Project.

During and after World War II, growth in population, industry, and military installations created new demands for water in southern California (Meyerson 2009). The California Legislature responded to the growing number of water consumers by passing the State Water Resources Act of 1945. The Act gave the State the authority to organize water development by creating the Water Resources Board to survey the State's water resources and produce plans for solving its water problems. In 1947, the State Legislature gave the initial authorization for a statewide water project, and a plan was developed under the direction of State Engineers Edward Hyatt and A. D. Edmonston (Leedom 1967).

In 1951, Edmonston presented the Feather River Project (later renamed the State Water Project [SWP]) to the State Legislature. The project included a multipurpose dam and reservoir near Oroville complete with a power plant, an afterbay dam, a peripheral canal, an electric power transmission system, an aqueduct to transport water from the Delta to Santa Clara and Alameda

counties, and a second aqueduct to carry water from the Delta to the San Joaquin Valley and southern California. In that same year, the State Legislature authorized construction of a water storage and supply system to capture and store runoff in northern California and distribute it to northern and southern California, the San Francisco Bay area, and the San Joaquin Valley (Leedom 1967). Edmonston later augmented the project, adding plans for the San Luis Reservoir, South Bay Aqueduct, and North Bay Aqueduct.

After devastating floods in the Sacramento Valley in 1955-1956, the State Legislature created DWR to oversee all state agencies involved in water development. The Governor appointed Harvey O. Banks director of the new department and tasked him with developing a plan for the proposed SWP. An emergency appropriation of approximately $25 million was passed by the Legislature in 1957 for flood control facilities on the Feather River and construction began at the Oroville site that same year. Appropriations were continued to fund the construction of the South Bay and California aqueducts in 1959 (JRP and Caltrans 2000).

Legislators, businessmen, and citizens' groups debated the statewide water plan. There were questions about the cost and engineering feasibility of the project, competing interests for water rights and water projects between northern and southern sections of the state, questions about water supply, and concern about continuance and protection of existing systems. During the administration of Governor Knight, special committees tried without success to draft a constitutional amendment for the allocation of water rights which would be acceptable to all parties. Governor Knight, members of the legislature, and constituents in the San Francisco Bay area and upper San Joaquin Valley fought for a constitutional amendment. The amendment would allocate specific amounts of water to southern and northern California, but this proved to be unacceptable to constituents with vested interests in water rights (Brown 1981).

Governor Knight's successor, Edmund G. "Pat" Brown Sr., was a strong advocate for the SWP and was determined to see the project completed. Acting on recommendations from his advisors, Governor Brown did not pursue a constitutional amendment; instead he supported a legislative act and bond act that gave authority to the governor to issue these bonds (Brown 1981). The Burns-Porter Act, coupled with a bond, authorized funds for construction of the SWP; this act was formally known as the California Water Resources Development Bond Act. It authorized the issuance of $1.75 billion in general obligation bonds to assist in the financing of immediate construction of the SWP facilities and later construction of specified additional works. The act was placed on the November 1960 ballot and was narrowly approved.

Construction of the SWP began in 1960-1961. But by the time William Gianelli was appointed Director of DWR in 1967, only a small part of the SWP was under construction. The bond from the Burns-Porter Act was insufficient to construct the SWP. Financing and maintaining financial integrity of the SWP became his primary concerns. Gianelli's objective was to complete those features that would protect the integrity of the SWP, that is, would enable the State to honor its commitment to supply water to the water supply agencies, receive payment for water, and not be a lien on the general tax base. Therefore, some features of the SWP had to be delayed, staged, or scaled down. Through a combination of bonds, sale of water and power, austerity measures, and tideland oil funds, the first phase of the SWP was completed by the target date of 1972-1973 at a

cost of $2.3 billion. Water flowed to the SWP terminus at Lake Perris in Riverside County on May 19, 1973 during an opening ceremony attended by Governor Ronald Regan and former governor Pat Brown (Herbert 1973; JRP and Caltrans 2000). Today, 29 water agencies have long-term contracts, with approximately 70 percent of SWP water going to urban users and 30 percent to agricultural users (DWR 2013).

In 1966, a *Los Angeles Times* reporter wrote that the "project, a unique water development system, will carry more water farther, lift it higher, convert it into more energy, and irrigate more land than any other system conceived by man" (Streshinsky 1966). The SWP has since been recognized for its engineering achievements and contribution to society. In 1971, the National Society of Professional Engineers named the SWP as one of the nation's top ten engineering achievements (DWR 1974). The American Society of Civil Engineers (ASCE) also selected the SWP for an Outstanding Civil Engineering Award in 1972 for its "contribution to the well-being of people and communities, the resourcefulness in planning and solving design problems, the pioneering use of materials and methods, its innovations in construction, in unusual aspects, and in esthetic values" (DWR 1974). In 2000, the ASCE selected the SWP as one of 10 internationally ranked "Monuments of the Millennium" (AECOM 2012). Today, the SWP is the nation's largest state-built water and power development and conveyance system. Planned, designed, constructed, and currently operated and maintained by DWR, the SWP provides water to 25 million Californians (about two-thirds of the state's population) and over 750,000 acres of irrigated farmland. The SWP includes: 34 water storage facilities, reservoirs, and lakes; 20 pumping plants; 4 pumping-generating plants; 5 hydroelectric power plants; and about 700 miles of canals and pipelines. Canals in the SWP system include the North Bay Aqueduct and the South Bay Aqueduct, which move water to the San Francisco Bay Area, and the California Aqueduct, which moves water to the San Joaquin Valley and southern California (DWR 2012).

California Aqueduct

While an aqueduct to bring water from northern California to the southern part of the State had been a part of the SWP from the beginning, the exact route and means of providing that water was a matter of extensive debate. It was originally conceived as a canal originating in the Sacramento-San Joaquin Delta and extending along the west side of the San Joaquin Valley to the foothills of the Tehachapi Mountains, with pumping plants placed as required to both lift the water from the Delta and make further lifts as required by the topography en route (DWR 1974). The route over the Tehachapi range, the "high line," was originally proposed by A.D. Edmonston in the mid-1950s. Regional political negations resulted in an extended debate over the route for the aqueduct (Cooper 1968). More westerly communities and water districts preferred a coastal route, which would require less pumping but result in longer lengths and greater construction costs. Easterly communities preferred the high line route, which would require water to be pump-lifted more than 2,000 feet uphill over the Tehachapi range, resulting in increased electrical costs for operation. Tunneling through the Tehachapi range was suggested, but this was rejected due to the destructive presence of the San Andreas Fault and engineers decided to place the pipelines above ground for easy access for future repair (Cooper 1968).

Selection of the aqueduct route would determine which areas in southern California would thrive and which would wait. Expanded growth would result in increases in demand for additional water

resources, with these demands needing to be met by the aqueduct and SWP. In 1956, the State Legislature authorized a comprehensive survey of alternative aqueduct routes and their economic and financial implications to determine the financial feasibility of the project. The study analyzed project population growth within southern California, as well as the economic feasibility of a variety of aqueduct routes bringing water from northern to southern California. It was determined that both a coastal and inland route would be necessary to supply southern California with water for its projected population. Engineers suggested a combination of routes, with aqueduct branches to carry water in several directions. In 1958, DWR unveiled the plan for the three branch system: coastal, western, and eastern:

> *The latest projections of future population and economic growth in these areas, as reported in this bulletin, indicate that the recent phenomenal growth therein will continue. It is estimated that about 5.5 million acre-feet of supplemental water would have to be imported from northern California by the year 2020 to sustain this growth, and that initial water deliveries would have to be made by 1965 in the San Joaquin Valley portion of these areas, and by 1971 to most of the remainder.*
>
> *It is concluded that the one system that would meet these demands for water most economically, would comprise an aqueduct from the Delta along the west side of the San Joaquin Valley to Avenal Gap, branching there into a coastal aqueduct leading to Santa Maria Valley, and an inland aqueduct from Avenal Gap south through Kern County and across the Tehachapi Mountains; with a west branch terminating at the north edge of San Fernando Valley and an east branch extending along the south edge of the Antelope Valley through the San Bernardino Mountains and terminating at Perris Reservoir site [Lake Perris] in Riverside County. This system would also provide the best combination, from the standpoint of mineral quality, of imported northern California water with the other sources of water, both local and imported, available to southern California (DWR 1958).*

With these modifications, the California Aqueduct was incorporated into the Burns-Porter Act as part of the SWP and set forth as the San Joaquin Valley-Southern California Aqueduct. Later, the name was changed officially to the "California Aqueduct." The California Aqueduct is divided into six divisions (North San Joaquin, San Luis, South San Joaquin, Tehachapi, Mojave, and Santa Ana), and two branches (West and Coastal) (DWR 1974). The East Branch of the California Aqueduct includes both the Mojave and Santa Ana Divisions, which later collectively became known as the "East Branch."

Construction on the California Aqueduct and its related infrastructure began in 1960. The fact that the aqueduct was the largest and most vital element of the SWP system meant contractors worked on it through the entire construction period of the SWP. The trapezoidal aqueduct, similar in geometry to the Central Valley Project's main canals, was lined with unreinforced concrete except in special areas where reinforced concrete was essential. As the aqueduct carries water south and makes deliveries along the way, it becomes narrower. At the northern end of the project, the canal's bottom width is 40 feet; where it crosses the Tehachapis into southern

California, the width is reduced to 24 feet (JRP and Caltrans 2000). In total length, the completed California Aqueduct measures 444 miles, making it the longest canal in the SWP system.

The first water service contract was signed with the MWD of Southern California on November 4, 1960, just four days before the general election in which the California voters approved the bond provisions of the Burns-Porter Act. By 1963, 13 southern California water agencies had signed contracts with DWR (DWR 1963). While many of the contracting agencies had been in existence prior to construction of the SWP, a number of new districts were formed for the express purpose of contracting for and delivering water. Previously, many had relied on groundwater resources and other sources that were inadequate to supply their water needs. Water delivery began in the northernmost districts, and extended south as sections of the aqueduct were completed (DWR 1958). The SWP began water deliveries to long-term contractors in the San Joaquin Valley by 1968. The aqueduct was constructed to the Tehachapi Range in 1971, and water delivered to Lake Perris, its southernmost point, in 1973, completing the initial SWP facilities. By 1974, the South San Joaquin Division served more agricultural customers than any other SWP canal (DWR 1974).

From the early 1970s to the late 1980s, design and construction activities centered on building power plants and adding pumping units and turbine-generators deferred from the initial construction, enlarging or extending aqueduct reaches, and providing facilities to ensure water quality in the Delta (DWR 2009). In the 1990s, design and construction activities focused on repairing and replacing components of existing facilities, constructing Phase 2 of the Coastal Branch to deliver water to San Luis Obispo and Santa Barbara counties, and extending the SWP to the San Gorgonio Pass service area (DWR 2009). Maintenance, improvement, and expansion of the California Aqueduct and associated facilities are an on-going process.

3.5.2 Regulatory Setting

Federal

Section 106 of the National Historic Preservation Act

The principal federal law addressing historic properties is the National Historic Preservation Act (NHPA), as amended (54 United States Code of Laws [USC] 300101 et seq.), and its implementing regulations (36 Code of Federal Regulations [CFR] Part 800). Section 106 of the NHPA requires a federal agency with jurisdiction over a proposed federal action (referred to as an "undertaking" under the NHPA) to take into account the effects of the undertaking on historic properties, and to provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking.

The term "historic properties" refers to "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register . . . [as well as] artifacts, records, and remains that are related to and located within such properties. . .[and] properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria" (36 CFR Part 800.16(*l*)(1)). The implementing regulations (36 CFR Part 800 et seq.) describe the process for identifying and evaluating historic properties, for assessing the potential adverse effects of federal undertakings

on historic properties, and seeking to develop measures to avoid, minimize, or mitigate adverse effects. The Section 106 process does not require the preservation of historic properties; instead, it is a procedural requirement mandating that federal agencies take into account effects to historic properties from an undertaking prior to approval.

The steps of the Section 106 process are accomplished through consultation with the State Historic Preservation Officer (SHPO), federally-recognized Indian tribes, local governments, and other interested parties. The goal of consultation is to identify potentially affected historic properties, assess effects to such properties, and seek ways to avoid, minimize, or mitigate any adverse effects on such properties. The agency also must provide an opportunity for public involvement (36 *CFR* 800.1(a)). Consultation with Indian tribes regarding issues related to Section 106 and other authorities (such as NEPA and Executive Order No. 13007) must recognize the government-to-government relationship between the federal government and Indian tribes, as set forth in Executive Order 13175, 65 FR 87249 (Nov. 9, 2000), and Presidential Memorandum of Nov. 5, 2009.

National Register of Historic Places

The National Register of Historic Places (National Register) was established by the NHPA as "an authoritative guide to be used by federal, State, and local governments, private groups and citizens to identify the Nation's historic resources and to indicate what properties should be considered for protection from destruction or impairment" (36 CFR 60.2) (U.S. Department of the Interior 2002). The National Register recognizes a broad range of cultural resources that are significant at the national, state, and local levels and can include districts, buildings, structures, objects, prehistoric archaeological sites, historic-period archaeological sites, traditional cultural properties, and cultural landscapes. As noted above, a resource that is listed in or eligible for listing in the National Register is considered "historic property" under Section 106 of the NHPA.

To be eligible for listing in the National Register, a property must be significant in American history, architecture, archaeology, engineering, or culture. Properties of potential significance must meet one or more of the following four established criteria (36 CFR 60.4):

A. Are associated with events that have made a significant contribution to the broad patterns of our history;

B. Are associated with the lives of persons significant in our past;

C. Embody 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; or

D. Have yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting one or more of the criteria of significance, a property must have integrity. Integrity is defined as "the ability of a property to convey its significance" (U.S. Department of the Interior 2002). The National Register recognizes seven qualities that, in various combinations, define integrity. The seven factors that define integrity are location, design, setting, materials, workmanship, feeling, and association. To retain historic integrity a property must possess

several, and usually most, of these seven aspects. Thus, the retention of the specific aspects of integrity is paramount for a property to convey its significance.

Ordinarily religious properties, moved properties, birthplaces or graves, cemeteries, reconstructed properties, commemorative properties, and properties that have achieved significance within the past 50 years are not considered eligible for the National Register unless they meet one of the Criteria Considerations (A-G), in addition to meeting at least one of the four significance criteria and possessing integrity (U.S. Department of the Interior 2002).

State

California Environmental Quality Act

CEQA is the principal statute governing environmental review of projects occurring in the state and is codified at *Public Resources Code (PRC)* Sections 21000 et seq. CEQA requires lead agencies to determine if a proposed project would have a significant effect on the environment, including significant effects on historical or unique archaeological resources. Under CEQA (Section 21084.1), a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.

The *CEQA Guidelines* (Title 14 *California Code of Regulations* [CCR] Section 15064.5) recognize that historical resources include: (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (California Register); (2) a resource included in a local register of historical resources, as defined in *PRC* Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of *PRC* Section 5024.1(g); and (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 by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record. The fact that a resource does not meet the three criteria outlined above does not preclude the lead agency from determining that the resource may be an historical resource as defined in *PRC* Sections 5020.1(j) or 5024.1.

If a lead agency determines that an archaeological site is a historical resource, the provisions of Section 21084.1 of CEQA and Section 15064.5 of the *CEQA Guidelines* apply. If an archaeological site does not meet the criteria for a historical resource contained in the *CEQA Guidelines,* then the site may be treated in accordance with the provisions of Sections 21083 et seq.,, which is as a unique archaeological resource. As defined in Section 21083.2 of CEQA a "unique" archaeological resource is 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 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,

- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological site meets the criteria for a unique archaeological resource as defined in Section 21083.2, then the site is to be treated in accordance with the provisions of Section 21083.2, which state that if the lead agency determines that a project would have a significant effect on unique archaeological resources, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place (Section 21083.2(b)). If preservation in place is not feasible, mitigation measures shall be required. The *CEQA Guidelines* note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment (*CEQA Guidelines* Section 15064.5(c)(4)).

A significant effect under CEQA would occur if a project results in a substantial adverse change in the significance of a historical resource as defined in *CEQA Guidelines* Section 15064.5(a). Substantial adverse change is defined as "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired" (*CEQA Guidelines* Section 15064.5(b)(1)). According to *CEQA Guidelines* Section 15064.5(b)(2), the significance of an historical resource is materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics that:

A. Convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or
B. Account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
C. Convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a lead agency for purposes of CEQA.

In general, a project that complies with the Secretary of the Interior's *Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Standards) (Grimmer 2017) is considered to have mitigated its impacts to historical resources to a less-than-significant level (CEQA Guidelines Section 15064.5(b)(3)).

California Register of Historical Resources

The California Register is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change (*PRC* Section 5024.1(a)). The criteria for eligibility for the California Register are based upon National Register criteria (*PRC* Section 5024.1((b)). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.

To be eligible for the California Register, a prehistoric or historic-period property must be significant at the local, State, and/or federal level under one or more of the following four criteria:

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 in our past;

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.

A resource eligible for the California Register must meet one of the criteria of significance described above, and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a historic resource may not retain sufficient integrity to meet the criteria for listing in the National Register, but it may still be eligible for listing in the California Register.

Additionally, the California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed on the National Register and those formally determined eligible for the National Register;
- California Registered Historical Landmarks from No. 770 onward; and,
- Those California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the California Register.

Other resources that may be nominated to the California Register include:

- Historical resources with a significance rating of Category 3 through 5 (those properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register);
- Individual historical resources;
- Historical resources contributing to historic districts; and,
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

California Health and Safety Code Section 7050.5

California Health and Safety Code Section 7050.5 requires that in the event human remains are discovered, the County Coroner be contacted to determine the nature of the remains. In the event the remains are determined to be Native American in origin, the Coroner is required to contact the California Native American Heritage Commission (NAHC) within 24 hours to relinquish jurisdiction.

California Public Resources Code Section 5097.98

California PRC Section 5097.98, as amended, provides procedures in the event human remains of Native American origin are discovered during project implementation. *PRC* Section 5097.98 requires that the immediate vicinity where the discovery occurred is subject to no further disturbances, is adequately protected according to generally accepted cultural and archaeological standards, and that further activities take into account the possibility of multiple burials. *PRC* Section 5097.98 further requires the NAHC, upon notification by a County Coroner, designate and notify those persons it believes to be the most likely descended from the deceased (MLD) regarding the discovery of Native American human remains. The MLD has 48 hours from the time of being granted access to the site by the landowner to inspect the discovery and provide recommendations to the landowner for the treatment of the human remains and any associated grave goods.

In the event that no descendant is identified, or the descendant fails to make a recommendation for disposition, or if the land owner rejects the recommendation of the descendant, the landowner may reinter the remains and burial items with appropriate dignity on the property in a location not subject to further disturbance.

California Government Code Sections 6254(r) and 6254.10

These sections of the California Public Records Act were enacted to protect archaeological sites from unauthorized excavation, looting, or vandalism. Section 6254(r) explicitly authorizes public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places and records of Native American places, features, and objects described in Sections 5097.9 and 5097.993 of the Public Resources Code maintained by, or in the possession of, the Native American Heritage Commission." Section 6254.10 specifically exempts from disclosure "records that relate to archaeological site information and reports maintained by, or in the possession of, the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, the Native American Heritage Commission, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a California Native American tribe and a state or local agency."

Local

Kern County General Plan

The Kern County General Plan (Section 1.10.3) contains the following relevant cultural resources policies and measures:

Policy

25. The County will promote the preservation of cultural and historic resources which provide ties with the past and constitute a heritage value to residents and visitors.

Implementation Measure

K. Coordinate with the California State University, Bakersfield's Archaeology Inventory Center.

L. The County shall address archaeological and historical resources for discretionary projects in accordance with the California Environmental Quality Act (CEQA).

M. In areas of known paleontological resources, the County should address the preservation of these resources where feasible.

N. The County shall develop a list of Native American organizations and individuals who desire to be notified of proposed discretionary projects. This notification will be accomplished through the established procedures for discretionary projects and CEQA documents.

O. On a project specific basis, the County Planning Department shall evaluate the necessity for the involvement of a qualified Native American monitor for grading or other construction activities on discretionary projects that are subject to a CEQA document.

Bakersfield General Plan

The project area is also located within the area governed by the *Metropolitan Bakersfield General Plan* (Bakersfield General Plan) (City of Bakersfield and Kern County 2002). Within the Land Use Element of the Bakersfield General Plan, there are goals, policies, and implementation measures that are applicable to the proposed project regarding cultural resources:

Policy 104: As part of the environmental review procedure, an evaluation of the significance of paleontological, archaeological, and historical resources and the impact of proposed development on those resources shall be conducted and appropriate mitigation and monitoring included for development projects.

Policy 105: Development on land containing known archaeological resources (i.e., high sensitivity areas) shall utilize methodology set forth, as described necessary by a qualified archaeologist, to locate proposed structures, paving, landscaping, and fill dirt in such a way as to preserve these resources undamaged for future generations when it is the recommendation of a qualified archaeologist that said resources be preserved in situ.

Policy 106: The preservation of significant historical resources as identified on Table 4.10-1 shall be encouraged by developing and implementing incentives such as building and planning application permit fee waivers, Mills Act contracts, grants and loans, implementing the State Historic Building Code and other incentives as identified in the City's Historic Preservation Ordinance.

Policy 107: The preservation of significant historical resources shall be promoted and other public agencies or private organizations shall be encouraged to assist in the purchase and/or relocation of sites, buildings, and structures deemed to be of historical significance.

3.5.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to cultural resources. The proposed project would have a significant impact if it would:

1. Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5.
2. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5.
3. Disturb any human remains, including those interred outside of dedicated cemeteries.
4. Result in cumulatively considerable impacts to cultural resources.

Methodology

The following discussion is based primarily on studies conducted as part of the cultural resources assessment prepared for the project (Ehringer et al. 2020).

Records Search

A records search was conducted on May 5, 2020 at the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC). The records search included a review of all previously recorded cultural resources and cultural resources studies within the project area and a 0.50-mile radius. In addition, the California Points of Historical Interest, the California Historical Landmarks, the California Register, the National Register, the Archaeological Determinations of Eligibility (ADOE), and the Built Environment Resources Directory (BERD) were reviewed.

Previous Cultural Resources Investigations

The records search results indicate that 131 cultural resources studies have been conducted within a 0.50-mile radius of the project area. Approximately 50 percent of the 0.50-mile records search radius has been included in previous cultural resources studies. Of the 131 previous studies, 86 overlap the project area. Approximately 40 percent of the Phase 1 area, 10 percent of the Phase 2 area, and 50 percent of the Kern Fan Conveyance Facilities area have been included in previous cultural resources studies.

Previously Recorded Cultural Resources

The records search results indicate that 130 cultural resources have been previously recorded within a 0.50-mile radius of the project area (37 historic built environment resources, 82 prehistoric archaeological resources, 7 historic-period archaeological resources, and 4 multicomponent archaeological resources[1]). Of these, 73 are within the project area (26 historic built environment resources, 39 prehistoric archaeological resources, 5 historic-period archaeological resources, and 3 multicomponent archaeological resources) (**Table 3.5-1**). A total of 24 cultural resources are within the Phase 1 area (19 historic built environment resources, 4 prehistoric archaeological resources, and 1 multicomponent archaeological resource). A total of 47 cultural resources are within the Kern Fan Conveyance Facilities area (5 historic built environment resources, 35 prehistoric archaeological resources, 5 historic-period archaeological resources, and 2 multicomponent archaeological resources). One resource is within the both the Phase 1 area and Kern Fan Conveyance Facilities area (historic built environment resource) and

[1] These resources include various combinations of prehistoric archaeological resources, historic-period archaeological resources, and /or historic architectural resources.

one is within all three areas, Phase 1 area, Phase 2 area, and Kern Fan Conveyance Facilities area, (historic built environment resource).

Of the previously recorded resources, only one is known to overlap currently proposed project activities: California Aqueduct (P-15-015820/CA-KER-008698H). The Kern Fan Conveyance Facilities will include a new turnout at the California Aqueduct to convey water and from the recharge sites, although the exact location of the new turnout has yet to be sited. The California Aqueduct is described in more detail following Table 3.5-1.

TABLE 3.5-1
PREVIOUSLY RECORDED CULTURAL RESOURCES WITHIN THE PROJECT AREA

Primary Number (P-15-)	Permanent Trinomial/ (CA-KER-)	Description	Location
124	124	Prehistoric archaeological site: light gray midden with fresh water clam shell	Kern Fan Conveyance Facilities area
126	126	Prehistoric archaeological site: large midden area with high concentration of shell	Kern Fan Conveyance Facilities area
180	180	Prehistoric archaeological site: habitation site and dense scatter of fresh water mussel sell and light lithic scatter	Kern Fan Conveyance Facilities area
358	358	Prehistoric archaeological site: flake stone scatter with flaked stone tools, one piece of groundstone, and a small quantity of shell; evidence of midden soil.	Kern Fan Conveyance Facilities area
359	359	Prehistoric archaeological site: lithic scatter with flaked stone tools	Kern Fan Conveyance Facilities area
360	360	Multicomponent site: prehistoric component consists of a sandy knoll with flakes and other detritus. The historic-period component consists of a couple dozen shards of amethyst glass	Kern Fan Conveyance Facilities area
1611	1611	Prehistoric archaeological site: scatter of artifacts and cultural remains including more than 20 pieces of chert debitage, freshwater clam and snail shells, and burned bone, a chert projectile point, etc.	Kern Fan Conveyance Facilities area
1612	1612	Prehistoric archaeological site: minimal lithic scatter with seven chert/silicate flakes	Kern Fan Conveyance Facilities area
2050	002050H	Historic built environment resource: Southern Pacific Railroad	Phase 1
2414	2414	Prehistoric archaeological site: scatter of artifacts and cultural remains including chert debitage, freshwater clam and snail shells, and burned bone, and a pestle fragment	Kern Fan Conveyance Facilities area
2415	2415	Prehistoric archaeological site: small lithic scatter	Kern Fan Conveyance Facilities area
2416	2416	Prehistoric archaeological site: light lithic scatter	Kern Fan Conveyance Facilities area
2417	2417	Prehistoric archaeological site: light lithic scatter across two loci with two pieces of burned large mammal bone and a few pieces of shell	Kern Fan Conveyance Facilities area
2418	2418	Prehistoric archaeological site: light lithic scatter with two loci along the edge of a slough	Kern Fan Conveyance Facilities area
2419	2419	Prehistoric archaeological site: lithic scatter consisting of chert, basalt and obsidian flakes	Kern Fan Conveyance Facilities area

TABLE 3.5-1
PREVIOUSLY RECORDED CULTURAL RESOURCES WITHIN THE PROJECT AREA (CONTINUED)

Primary Number (P-15-)	Permanent Trinomial/ (CA-KER-)	Description	Location
420	2420	Prehistoric archaeological site: light lithic scatter composed mostly of grey and white cherts; one secondary obsidian flake and one secondary chalcedony flake	Kern Fan Conveyance Facilities area
2503	2503	Prehistoric archaeological site: dense lithic scatter	Kern Fan Conveyance Facilities area
2504	2504	Prehistoric archaeological site: flakes and few ground stone fragments	Kern Fan Conveyance Facilities area
3071	3071	Prehistoric archaeological site: lithic debris including desert side-notched projectile point and numerous flakes of jasper, chert, and chalcedony	Kern Fan Conveyance Facilities area
3073	3073	Prehistoric archaeological site: large dispersed lithic scatter with chipped and groundstone tools	Kern Fan Conveyance Facilities area
3088	3088	Prehistoric archaeological site: lithic debris consisting of one chert dart point, and flakes of chert, jasper, basalt, and chalcedony	Kern Fan Conveyance Facilities area
3112	3112	Prehistoric archaeological site: lithic debris with numerous flakes of chert, obsidian, basalt, and chalcedony	Kern Fan Conveyance Facilities area
3113	3113	Prehistoric archaeological site: lithic debris with numerous flakes of chert, obsidian, basalt, and chalcedony; chert biface and chert projectile point	Kern Fan Conveyance Facilities area
3145	3145	Prehistoric archaeological site: lithic scatter including one obsidian projectile point and chalcedony, chert, and basalt flakes	Kern Fan Conveyance Facilities area
3150	3150	Prehistoric archaeological site: small surface flake scatter	Kern Fan Conveyance Facilities area
3152	3152	Prehistoric archaeological site: dispersed lithic scatter including one obsidian biface fragment and numerous chert, chalcedony, and basalt flakes	Kern Fan Conveyance Facilities area
3160	3160	Prehistoric archaeological site: dispersed lithic scatter	Kern Fan Conveyance Facilities area
3162	3162	Prehistoric archaeological site: scatter of chalcedony and chert flakes	Kern Fan Conveyance Facilities area
3253	003253H	Historic-period archaeological site: scatter containing 200 plus cans, clear and brown glass bottle fragments and some ceramic objects	Kern Fan Conveyance Facilities area
5984	5018	Prehistoric archaeological site: large lithic scatter containing numerous flakes of chert, chalcedony, and basalt; large side notched projection point, obsidian biface fragment, and shell bead; and possible human remains	Kern Fan Conveyance Facilities area
6024	005038H	Historic-period archaeological site: glass and ceramic scatter consistent with trash of the post WWII era	Kern Fan Conveyance Facilities area
6026	-	Prehistoric isolate: one sandstone bowl fragment	Kern Fan Conveyance Facilities area
8000	-	Historic built environment resource: building	Phase 1
8026	-	Historic built environment resource: Cross Valley Canal	Phase 1 and Kern Fan Conveyance Facilities area
8066	-	Historic built environment resource: building	Phase 1

TABLE 3.5-1
PREVIOUSLY RECORDED CULTURAL RESOURCES WITHIN THE PROJECT AREA (CONTINUED)

Primary Number (P-15-)	Permanent Trinomial/ (CA-KER-)	Description	Location
8098	-	Historic built environment resource: building	Phase 1
8099	-	Historic built environment resource: building	Phase 1
8121	-	Historic built environment resource: Rio Bravo Canal	Phase 1
8157	-	Historic built environment resource: building	Phase 1
8158	-	Historic built environment resource: building	Phase 1
8159	-	Historic built environment resource: building	Phase 1
8162	-	Historic built environment resource: building	Phase 1
8172	-	Historic built environment resource: building	Phase 1
8237		Historic built environment resource: building	Phase 1
9035	-	Prehistoric isolate: granitic mano fragment	Kern Fan Conveyance Facilities area
9046	-	Prehistoric isolate: chert percussion flake	Phase 1
9312	-	Prehistoric isolate: broken Cottonwood projectile point	Phase 1
9315	-	Prehistoric isolate: chert flake	Phase 1
9316	-	Prehistoric isolate: granitic stone bowl	Kern Fan Conveyance Facilities area
9317	-	Prehistoric isolate: one non-diagnostic obsidian flake	Kern Fan Conveyance Facilities area
9671	-	Historic built environment resource: Chevron 12” pipeline spanning 108 linear miles and seven pump stations	Kern Fan Conveyance Facilities area
11157	6504	Prehistoric archaeological site: scatter of artifacts and cultural remains including chert debitage, freshwater clam and snail shells, and burned bone; and an incised steatite fragment.	Kern Fan Conveyance Facilities area
11452	006669/H	Multicomponent site: historic house complex and prehistoric artifacts (including arrowheads, grinding stones, stone bowls) on top of a mound	Phase 1
11716	-	Historic built environment resource: single-family property	Phase 1
11717	-	Historic built environment resource: single-family property	Phase 1
11718	-	Historic built environment resource: single-family property	Phase 1
12664	-	Historic built environment resource: Wesco-Clark Oil Derrick	Phase 1
13725	007701H	Historic built environment resource: East Side Canal constructed circa 1870	Phase 1, Phase 2, and Kern Fan Conveyance Facilities area
13726	007702H	Historic built environment resource: historic irrigation canal known as the Main Drain Canal	Kern Fan Conveyance Facilities area
15199	-	Historic built environment resource: The Strand Ranch house	Phase 1
15675	-	Prehistoric isolate: light grey chert flake	Kern Fan Conveyance Facilities area
15676	008655H	Historic-period archaeological site: scatter consisting of pieces of white ware and clear glass	Kern Fan Conveyance Facilities area

TABLE 3.5-1
PREVIOUSLY RECORDED CULTURAL RESOURCES WITHIN THE PROJECT AREA (CONTINUED)

Primary Number (P-15-)	Permanent Trinomial/ (CA-KER-)	Description	Location
15677	008656H	Historic-period archaeological site: scatter consisting of six pieces of solarized clear glass, three pieces of aqua glass, and a fragment of a glass handle	Kern Fan Conveyance Facilities area
15678	-	Historic-period isolate: solarized clear glass electric insulator	Kern Fan Conveyance Facilities area
15688	008662/H	Multicomponent site: historic-period component consists of concrete foundation and historic trash scatters from the mid to late 1800s to the mid-1900s and several historic roads. Prehistoric component consists of multiple shell concentrations and two FAR concentrations, a projectile point and two point tips	Kern Fan Conveyance Facilities area
15690	-	Historic built environment resource: pump house constructed in the 1940s	Kern Fan Conveyance Facilities area
15692	-	Historic built environment resource: Main Canal	Kern Fan Conveyance Facilities area
15818	-	Prehistoric isolate: one small white chert flake	Phase 1
15820	008698H	Historic built environment resource: California Aqueduct	Kern Fan Conveyance Facilities area
17760	-	Historic built environment resource: complex of 15 oil production related features	Phase 1
17761	009798H	Historic built environment resource: two discontinuous segments of Pioneer Canal	Phase 1
19625	-	Prehistoric isolate: brown mottled red chert shatter	Kern Fan Conveyance Facilities area
19626	-	Prehistoric isolate: tan chert interior piece of shatter	Kern Fan Conveyance Facilities area

California Aqueduct (P-15-015820/CA-KER-008698H)

The California Aqueduct (or Aqueduct) was determined eligible for the National Register at the state level of significance under Criteria A and C. The period of significance for the resource was identified as 1960-1974, the years of construction (Donaldson 2012). The California Aqueduct is eligible under Criterion A as the largest and most significant of the water conveyances systems developed as part of the State Water Project (SWP) in California:

> *The State Water Project includes 701 miles of aqueducts, canals and pipelines and the California Aqueduct comprises 444 miles of the system. The aqueduct was a critical component of the State Water Project and was an essential feature in the development of California. The water serves users in the San Joaquin Valley where the aqueduct allowed thousands of acres of new land to be cultivated, thereby dramatically increasing California's agricultural efforts in the region and propelling the state to the top in nationwide in agricultural production. In Southern California, the aqueduct serves municipal users by supplying drinking water. The aqueduct represents one of the boldest and successful public works projects ever initiated by a state government. The*

> *California Aqueduct profoundly altered the distribution of water resources across California. Without its construction, the maldistribution of water in California would likely have continued because Northern California still receives more rain than any other region in California. Without the State Water Project and the aqueduct, precious runoff would have drained into to the ocean unused. The forecasted population increases, particularly for Southern California and the San Francisco Bay Area necessitated a system of water redistribution. The aqueduct facilitated the agricultural development the San Joaquin Valley and Southern California (AECOM, 2012).*

As an engineering structure, the California Aqueduct meets Criterion C for its design innovations in the construction of the system:

> *the context of water conveyance, it is a significant and distinguishable engineering entity significant for its type, period and method of construction and is the largest water conveyance structure in California. The trapezoidal design and the concrete lining of the aqueduct allowed it to carry more water and reduce the loss of head water and seepage and made the aqueduct more efficient. Because the State Water Project operates on a controlled volume concept, the design for the aqueduct required more check structures that could accommodate change in flows during peak flows with a minimal surface fluctuation. The California Aqueduct was built as a utility system with the capacity for performance and a tremendous amount of structural integrity. The aqueduct is also distinguishable in its use of a high depth-width ratio which allowed for the reduction of adverse effects of alignment curvature on the flow (AECOM 2012).*

Previously completed evaluations of the California Aqueduct identified various aspects of the canal and its ancillary infrastructure as "contributing elements," or "character-defining features." In 2007, Carey & Co. completed Department of Parks and Recreation (DPR) 523 forms for the California Aqueduct, stating that character-defining features are the California Aqueduct's open trapezoidal design and concrete lining. In 2009, ESA completed DPR 523 forms for the East Branch identifying the canal and its ancillary infrastructure (overcrossings, check structures, power plants, overchutes, etc.) as contributing elements (Anderson, 2009). In sum, character-defining features and contributing elements of the California Aqueduct are identified as follows (Brewster, 2012):

- Planned and Engineered relationship with natural features and impediments for Canal alignment (or route) – The alignment of the California Aqueduct was designed to be the most efficient route that would move water to the areas of greatest projected growth and agricultural needs while traversing substantial distances through distinctive natural features of California. As a key component and the longest water conveyance feature of the State Water Project, the 444-mile-long south-flowing alignment's (or route's) planned and engineered relationship to the gradual slope and western foothills of the San Joaquin Valley, topography of the Tehachapi Mountains, and desert basin of the Antelope Valley/Mojave is considered character-defining.
- Open trapezoidal design – The canal is constructed with a trapezoidal profile facilitating the conveyance of higher volumes of water. The canal's open trapezoidal design is considered a character-defining feature.

- Concrete lining – Engineers designed an unreinforced concrete canal lining to limit seepage, lower loss of headwater from friction, and which requires less maintenance than an earthen-lined canal, resulting in a more efficient system. The canal's concrete lining is thus considered a character-defining feature.
- Ancillary infrastructure – Canal infrastructure, including but not limited to, canal check structures and siphons, overcrossings (bridges), and culverts and overchutes constructed as part of the overall California Aqueduct system between 1960 and 1974, also should generally be considered to be contributing elements.

Native American Outreach

The NAHC maintains a confidential Sacred Lands File (SLF) which contains sites of traditional, cultural, or religious value to the Native American community. The NAHC was contacted on May 5, 2020 to request a search of the SLF. The NAHC responded to the request in a letter dated May 6, 2020 indicating that the results of the SLF were negative. The letter also included a list of California Native American tribes who may have knowledge of resources within the project area. On July 23, 2020, letters were sent via email or mail to a 16 representatives representing a total of 11 California Native American tribes. Follow-up phone calls were placed on August 7, 2020. A summary of outreach efforts is provided in Section 3.15 – Tribal Cultural Resources.

Geoarchaeological Review

A desktop geoarchaeological review was conducted in order to characterize the geology of the project area and to assess the potential for the presence of subsurface archaeological resources within the project area. The review included a review of geologic maps, geological literature, and archival research through the Natural Resources Conservation Service (NRCS).

The proposed project is located in southwestern San Joaquin Valley, a portion of the Central Valley lying south of the Sacramento-San Joaquin River delta. The Central Valley, including the San Joaquin Valley, is a massive depositional basin situated between the Sierra Madre Range to the east and the Coast Ranges to the west. The proposed project is located at the eastern toe of the Elk Hills, part of the Tremblor Range in the Southern Coast Ranges. The Elk Hills are composed of Pleistocene to late Pliocene-aged, weakly-consolidated, stream-laid alluvial sediments known as the Tulare Formation (Dibblee and Minch 2005; Smith 1964). The upper Tulare Formation consists of Monterey siliceous shale debris pebbles, sand and clay, while the lower Tulare Formation includes limestone. The presence of a very slight east to west slope within the proposed project implies that the project is situated where the eastward-building alluvial fan from the Elk Hills coalesces with an alluvial fan extending westward from the Sierra Madre; the Kern River transports sediments out the Sierra Madre and deposits them within the valley. The proposed project is largely underlain by Late Holocene-aged alluvial sand and gravel (Dibblee and Minch 2005; Hayden and Hayhurst 2011). Interstate 5 follows an area underlain by Late Pleistocene to Holocene lacustrine, playa, and estuarine deposits that tend to be shallow, often ephemeral, and form in the flat valley bottom. As a result, much of the Phase 2 area and a portion in the northern half of the Kern Fan Conveyance Facilities area are underlain by older sediments when compared to the Phase 1 area.

The geomorphic setting of the proposed project suggests that fluvial activity associated with alluvial fan building and remodeling has been the dominant geomorphic process since the Pleistocene. As noted above, playas are also characteristic of the area. Eolian processes, resulting in windblown erosion and deposition, have undoubtedly played an important geomorphic role at various times in the past. In particular, removal of natural vegetation and plowing for agriculture would have made the landscape more susceptible to wind erosion. The practical effect of agricultural plowing/discing has been to churn, expose, and eventually rebury archaeological remains within the depth of plowing. The eastern portion of the Phase 1 area interfingers with the developed outskirts of Rosedale.

The relatively small grain-size of the alluvial parent material (clay, silt, and fine sand) of the soil solum implies the dominance of low-energy fluvial and lacustrine processes within the proposed project. Clays and silts in particular indicate slackwater conditions consistent with standing water characteristic of a marshes, sloughs and playas. The absence of significant quantities of gravel suggests that the fluvial regime lacked the competence needed to transport dense, including pebbles, lithic flakes and other artifacts, into the proposed project; if artifacts are present within the project area, it is likely that they are in approximately the same location as when they were originally deposited.

Mapped soils within the proposed project consist of deep, relatively fine grained soils developed in alluvium, including granitic and calcareous rock fragments. The presence of granitic parent material corroborates the contribution of sediments from the Sierra Madre. Soils series include clay (Buttonwillow, Lokern), clay loam (Calfax, Lerdo, Panoche), silt loam (Garces), sandy loam (Excelsior, Kimberlina, Milham, Wasco, Westhaven), and loamy sand (Granoso) (NRCS 2020). These soil types are somewhat poorly drained to somewhat excessively drained, and are well suited to agriculture. The presence of stratified sands and loams is evidence for long-term, repeated flooding that has resulted in aggradation of the valley. Soil parent material texture correlates broadly with geographic location such that coarser grained soils (loamy sand, sandy loam) are found to the east in the Phase 1 area and textures become generally finer towards the west with clay being found in the Phase 2 area. From this pattern, it is possible to infer that the Phase 2 area and Kern Fan Conveyance Facilities area would have been more frequently covered with standing water in the form of shallow lakes.

The relatively greater age of the Late Pleistocene to Holocene deposits underlying large portions of Kern Fan Conveyance Facilities area may account, in part, for the disproportionate number of precontact archaeological sites discovered within this area when compared with the younger deposits of the Phase 1 area. The general absence of precontact sites in the Phase 2 area, which shares much geomorphically in common with the Kern Fan Conveyance Facilities area suggests that other factors, such as archaeological survey coverage and intensity, are also conditioning the recorded locations of archaeological sites. In their modeling of buried archaeological site potentials in Caltrans Districts 6 and 9, Meyer et al. (2010) classify the Phase 2 area and Kern Fan Conveyance Facilities area as High sensitivity for buried archaeological sites primarily on landform age and proximity to water, whereas the Phase 1 area is classified largely as Moderate and Very Low sensitivity for buried archaeological sites.

Impact Analysis

Historical Resources

Impact 3.5-1:. The project could cause a substantial adverse change in the significance of a historical resource, as defined in *CEQA Guidelines* Section 15064.5. (*Less than Significant Impact with Mitigation*)

One known historical resource, the California Aqueduct (P-15-015820/CA-KER-008698H), was identified within the project area. The California Aqueduct was previously determined eligible for the National Register through consensus with the SHPO, and therefore meets the definition of historical resources in *CEQA Guidelines* Section 15064.5.

Under CEQA, a significant effect would occur if a project results in a substantial adverse change in the significance of a historical resource. The significance of a historical resource is materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics that convey its historical significance (*CEQA Guidelines* Section 15064.5(b)). In general, for purposes of the California Aqueduct, potential changes could include demolition of or material alteration in adverse manner to the character-defining features of the Aqueduct, include the Aqueduct's alignment/route, open trapezoidal design, concrete lining, and ancillary infrastructure (canal check structures and siphons, overcrossings/bridges, culverts, overchutes, and turnouts).

The proposed project includes a new turnout, additional canals and pipelines, and pump stations to convey water to and from the California Aqueduct and proposed recharge and recovery facilities. Water would be conveyed from the California Aqueduct to and from the recharge sites through a new turnout at the California Aqueduct. The exact location of the new turnout has yet to be determined, but would be located within the Kern Fan Conveyance Facilities area.

Regardless of where the new turnout is located impacts to the California Aqueduct would be minimal. The proposed project would not alter the canal's alignment or open trapezoidal design, and neither of these character-defining features would be impacted. The proposed project likewise would not demolish or alter the types of canal infrastructure that contribute to the Aqueduct's significance, such as canal check structures and siphons, overcrossings/bridges, culverts, overchutes, or existing turnouts. While some of these types of infrastructure are likely present along some segments of the Aqueduct within the Kern Fan Conveyance Facilities area, they would not be altered as part of the proposed project.

None of the proposed project activities would impact the integrity of the Aqueduct in a manner that would inhibit its ability to convey its historical significance under either Criterion A or Criterion C. Introduction of a new turnout and additional canals or pipelines would not diminish the physical aspects of integrity, including the location, design, materials, and workmanship of the property. Rather the project proposes improvements of the type and scale that already exist as part of the property. Integrity of the setting of the Aqueduct would be retained as the improvements are compatible with the existing physical character of the property and would not present visually perceptible alterations in the spatial relationships associated with the property as

it currently exists. The property's feeling and association as a mid–20th century engineering feature tied to the SWP system would not be altered as a result of the proposed project.

The Aqueduct provides water to millions of people, transporting it from a wetter climate in northern California to a drier climate in southern California. Introduction of a new turnout would not impact the ability of the system to convey its overall significance under Criterion A as a water conveyance system that is significant for its solution to water distribution in California. Similarly, the proposed project would not alter the Aqueduct's ability to convey its significance under Criterion C as an award-winning engineering achievement of the last century. Upon completion of the proposed project, the Aqueduct would continue to serve as one of the largest water conveyance systems in California and it would continue to convey its historical significance. Therefore, the proposed project is not anticipated to result in a substantial adverse change to the Aqueduct.

Additionally, 25 other historic built environment resources and 47 archaeological resources have been previously recorded within the project area. It is unknown if any of these resources would be impacted since the project components have yet to be sited. There could also be other as yet undocumented historic built environment resources or archaeological resources that could be impacted by the proposed project. The geoarchaeological review indicated that the Phase 2 area and Kern Fan Conveyance Facilities area have a higher sensitivity for buried archaeological sites, whereas the Phase 1 area has a moderate to very low sensitivity for buried archaeological resources. If known or unknown historic built environment resources or archaeological resources are impacted by the project and determined to be historical resources as defined in *CEQA Guidelines* Section 15064.5, impacts to the resources could be significant. Implementation of Mitigation Measures **CUL-1** through **CUL-11**, which require retention of a qualified professionals, and provide for additional cultural resources studies, evaluation and treatment of resources, development of a cultural resources monitoring and mitigation program, and construction worker cultural resources sensitivity training, would ensure that impacts are reduced to a less-than-significant level.

Mitigation Measures

CUL-1: The Authority shall retain a Qualified Architectural Historian (defined as an architectural historian, historic architect, or historic preservation professional who meets the Secretary of the Interior's Professional Qualification Standards for History, Architectural History, or Architecture, pursuant to 36 CFR 61) to carry out all mitigation related to historic built environment resources.

CUL-2: Historic Resources Assessment. Once project elements have been sited, the Qualified Architectural Historian shall conduct a historic resources assessment including: a review of pertinent archives and sources to identify historic built environment resources within or adjacent to project components; a pedestrian field survey; recordation of all identified historic built environment resources on California Department of Parks and Recreation 523 forms; evaluation of historic built environment resources that may be affected by the project for listing in the National Register and California Register under Criteria A/1-D/4; impacts analysis; development of appropriate treatment; and preparation of a technical report documenting the methods and results of the assessment.

The Historic Resources Assessment Report with recommendations and shall be submitted to the Authority for review and approval prior to the its approval of project plans.

CUL-3: Retention of a Qualified Archaeologist. The Authority shall retain a Qualified Archaeologist (defined as an archaeologist who meets the Secretary of the Interior's Professional Qualification Standards for Archaeology, pursuant to 36 CFR 61) to carry out all mitigation related to archaeological resources.

CUL-4: Archaeological Resources Assessment. Once project elements have been sited, the Qualified Archaeologist shall conduct an archaeological resources assessment of the project area(s). This shall include an archaeological resources survey, and Extended Phase I and/or Phase II testing as determined necessary by the Qualified Archaeologist to determine if any archaeological resources qualify as historical resources or unique archaeological under CEQA. The Qualified Archaeologist shall document the results of the assessment in a technical report that follows *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* (OHP 1990). If more than 2 years have passed since the previous records searches, then the Qualified Archaeologist shall conduct searches of the Southern San Joaquin Valley Information Center and Native American Heritage Commission Sacred Lands File prior to conducting the survey. The assessment report shall be completed and approved by the Authority prior to its approval of project plans.

CUL-5: Avoidance and Preservation in Place of Archaeological Resources. The Authority shall make efforts to avoid and preserve in place potentially significant or significant archaeological resources. Avoidance and preservation in place is the preferred manner of mitigating impacts to archaeological resources. Preservation in place may be accomplished by, but is not limited to, avoidance, incorporating the resource into open space, capping, or deeding the site into a permanent conservation easement. In the event that avoidance and preservation in place of a resource is determined by the Authority , in consultation with the Qualified Archaeologist, to be infeasible in light of factors such as project design, costs, and other considerations, then Mitigation Measures CUL-6 shall be implemented for that resource. If avoidance and preservation in place of a resource is determined by the Authority to be feasible, then Mitigation Measures CUL-7 and CUL-8 shall be implemented for that resource.

CUL-6: Phase III Archaeological Resources Data Recovery and Treatment. The Qualified Archaeologist shall prepare a Phase III Archaeological Resources Data Recovery and Treatment Plan for all significant resources that will be impacted by the proposed project, including those that qualify as historical resources or unique archaeological resources. When determining if data recovery is necessary, the Qualified Archaeologist shall first consider if the data potential of the impacted portion of the resource has been exhausted through previous testing. The Phase III Archaeological Resources Data Recovery and Treatment Plan shall include: research design; field and laboratory methods; other applicable treatment measures; field security measures; reporting requirements and schedule; procedures for human remains discoveries; curation requirements; and protocols for Native American input, review of documents, and monitoring. For resources that are Native American in origin, treatment shall be developed by the Qualified Archaeologist in consultation with the Authority and one or more Native American representatives listed on the California Native American Heritage Commission's contact list for the project. The Qualified Archaeologist shall submit the

final Phase III Archaeological Resources Data Recovery Report to the Southern San Joaquin Valley Information Center within 30 days of its acceptance by the Authority.

CUL-7: Cultural Resources Mitigation and Monitoring Program. The Qualified Archaeologist shall prepare a Cultural Resources Mitigation and Monitoring Program (CRMMP) based on the final approved project design plans. The CRMMP shall be submitted to the Authority at least 60 days prior to the start of any ground-disturbing activities. The CRMMP shall include: an outline of areas and maps where archaeological and Native American monitoring is required; roles and responsibilities of the monitors; procedures to follow in the event of the archaeological resources and human remains discoveries; notification and communication protocols; reporting requirements (e.g., weekly, monthly, final); curation requirements; and protocols for Native American input and review of documents. Upon completion, the Qualified Archaeologist shall submit a final Archaeological Resources Monitoring Report to the Southern San Joaquin Valley Information Center within 30 days of its acceptance by the Authority .

CUL-8: Designation of Environmentally Sensitive Areas. Prior to the start of ground disturbance, any avoided archaeological resources on the project site and within 100 feet of project-related activities shall be marked as Environmentally Sensitive Areas (this includes archaeological resources that qualify as historical resources or unique archaeological resources, or those that have not been evaluated). These areas shall not be marked as archaeological resources, but shall be designated as "exclusion zones" on project plans. The Qualified Archaeologist, or their designee, shall periodically inspect these areas for the duration of project activities in the vicinity to ensure that the area remains intact and no incursions into the exclusion zones have occurred. Upon completion of all project-related activities in the vicinity, all protective signage shall be removed.

CUL-9: Construction Worker Cultural Resources Sensitivity Training. Prior to start of any ground-disturbing activities, the Qualified Archaeologist, or his/her designee, shall conduct cultural resources sensitivity training for all construction personnel. In the event construction crews are phased, additional trainings shall be conducted for new construction personnel. Construction personnel shall be informed of the types of archaeological resources that may be encountered, the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains, confidentiality of discoveries, and safety precautions to be taken when working with archaeological and Native American monitors. The Authority shall ensure construction personnel are made available for and attend the training and retain documentation demonstrating attendance.

CUL-10: Inadvertent Discovery of Archaeological Resources. In the event that archaeological resources are encountered during ground disturbance, all activity in the vicinity of the find shall cease (within 100 feet), and the protocols and procedures for discoveries outlined in the CRMMP shall be implemented. The discovery shall be evaluated for potential significance by the Qualified Archaeologist. If the Qualified Archaeologist determines that the resource may be significant, the Qualified Archaeologist shall develop an appropriate treatment plan for the resource. When assessing significance and developing treatment for resources that are Native American in origin, the Qualified Archaeologist and the Authority shall consult with one or more Native American representatives listed on the California Native American Heritage Commission's contact list for the project. The Qualified Archaeologist shall also

determine if work may proceed in other parts of the project area(s) while treatment (e.g., data recovery) for cultural resources is being carried out.

CUL-11: Curation. Disposition of Native American archaeological materials shall be determined through consultation between one or more Native American representatives listed on the California Native American Heritage Commission's contact list for the project, the Qualified Archaeologist, and the Authority. Disposition of artifacts associated with Native American human remains shall be determined through consultation between the Most Likely Descendant, landowner, and the Authority.

Any significant historic-period archaeological materials that are not Native American in origin shall be curated at a repository accredited by the American Association of Museums that meets the standards outlined in 36 CFR 79.9. If no accredited repository accepts the collection, then it may be curated at a non-accredited repository as long as it meets the minimum standards set forth by 36 CFR 79.9. If neither an accredited nor a non-accredited repository accepts the collection, then it may be offered to a public, non-profit institution with a research interest in the materials, or donated to a local school or historical society in the area for educational purposes, to be determined by the Qualified Archaeologist in consultation with the Authority.

Significance Determination

Less than Significant Impact with Mitigation

Archaeological Resources

Impact 3.5-2: The proposed project could cause a substantial adverse change in the significance of an archaeological resource pursuant to *CEQA Guidelines* Section 15064.5. (*Less than Significant Impact with Mitigation*)

As discussed under Impact 3.5-2, a total of 47 archaeological resources have been previously documented within the proposed project area and there could be as yet undocumented archaeological resources in the project area, including surface and subsurface resources. If known or unknown archaeological resources are impacted by the project and determined to be historical resources as defined in *CEQA Guidelines* Section 15064.5 or unique archaeological resources pursuant to as defined in *PRC* Section 21083.2, impacts to the resources could be significant. Implementation of Mitigation Measures CUL-3 through CUL-11, which include the retention of a Qualified Archaeologist, additional archaeological studies, avoidance of resources if feasible, data recovery, development of a cultural resources monitoring and mitigation program, construction worker cultural resources sensitivity training, establishment of Environmentally Sensitive Areas, treatment of inadvertent discoveries, and curation of recovered materials, would ensure that impacts are reduced to a less-than-significant level.

Mitigation Measures

Implement Mitigation Measures CUL-3 through CUL-11.

Significance Determination

Less than Significant Impact with Mitigation

Human Remains

Impact 3.5-3: The proposed project could disturb human remains, including those interred outside of formal cemeteries. (*Less than Significant Impact with Mitigation*)

One known site within the project area was identified as containing possible human remains. Additionally, some portions of the project area are known to have been used by prehistoric Native Americans. In the event that human remains are inadvertently discovered during project construction activities, the human remains could be inadvertently damaged, which could be a significant impact. Implementation of **Mitigation Measure CUL-12** would reduce impacts to human remains to a less-than-significant level.

Mitigation Measures

CUL-12: Inadvertent Discovery of Human Remains. If human remains are encountered, then the Authority shall halt work in the vicinity (within 100 feet) of the discovery and contact the County Coroner in accordance with *Public Resources Code* Section 5097.98 and *Health and Safety Code* Section 7050.5. If the County Coroner determines the remains are Native American, then the Coroner shall notify the California Native American Heritage Commission in accordance with Health and Safety Code subdivision 7050.5(c), and *Public Resources Code* Section 5097.98. The California Native American Heritage Commission shall designate a Most Likely Descendant for the remains pursuant to *Public Resources Code* Section 5097.98. Until the landowner has conferred with the Most Likely Descendant, the contractor shall ensure the immediate vicinity where the discovery occurred is not disturbed by further activity, is adequately protected according to generally accepted cultural or archaeological standards or practices, and that further activities take into account the possibility of multiple burials. If human remains are encountered, the Qualified Archaeologist, in consultation with the Most Likely Descendant shall prepare a confidential report documenting all activities and it shall be submitted to the California Native American Heritage Commission within 90 days after completion of any treatment.

Significance Determination

Less than Significant Impact with Mitigation

Cumulative Impacts

Impact 3.5-4: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to cultural resources. (*Less than Significant Impact with Mitigation*)

The cumulative projects to be considered in the analysis of cumulative impacts are listed in Table 3-2 and illustrated on Figure 3-1 in Chapter 3 of this Draft EIR. The geographic area of analysis of cumulative impacts for cultural resources includes the area bounded by those projects listed in Table 3-2. This geographic scope of analysis is appropriate because the archaeological and historical resources within this area are expected to be similar to those that occur on the project area because of their proximity, and because the similar environments, landforms, and hydrology

would result in similar land-use and thus, site types. The projects listed in Table 3-2 include water infrastructure projects that could contain cultural resources. Cumulative impacts to cultural resources could occur if other related projects, in conjunction with the proposed project, had or would have impacts on cultural resources that, when considered together, would be significant.

Construction and Operation

Construction and operation of the proposed project, in combination with other projects in the area, has the potential to contribute to a cumulatively significant cultural resources impact due to the potential loss of historical and archaeological resources unique to the region. A total of 73 resources were identified within the project area as a result of the cultural resources assessment, including 47 archaeological resources and 26 historic built environment resources. Of these, it is currently known that one historical resource will be impacted by the project (California Aqueduct [P-15-015820/CA-KER-008698H]).

As discussed under Impact 3.5-1, the project is not anticipated to result in a substantial adverse change to the California Aqueduct (P-15-015820/CA-KER-008698H) and impacts to the California Aqueduct are less than significant. While other past and foreseeable projects have or will impact the California Aqueduct (see Table 3-2), the proposed project would result in less than significant impacts and it could not contribute to a cumulative effect when combined with other projects. Therefore, the project's incremental impact to this historical resource is not cumulatively considerable.

Potential impacts to the other known 72 historical or archaeological resources are undetermined at this time since the project components have yet to be sited. Additionally, there could be as yet undocumented in the project area, including surface and subsurface resources, that may be impacted by the project. Nevertheless, Mitigation Measures CUL-1 through CUL-11 are included in this EIR to reduce potentially significant project impacts to both known and unknown historical and archaeological resources to less than significant, which would, in turn, reduce the project's incremental contribution to cumulative impacts to less than significant. Implementation of these mitigation measures would reduce potential impacts to historical and archaeological resources to a less-than-significant level.

Although project construction has the potential to disturb human remains, Mitigation Measure CUL-12 requires compliance with state laws dictating the appropriate treatment of any unearthed human remains. With implementation of this measure, and adherence to state laws, there will be a less-than-significant impact to human remains. Therefore, the project's incremental impact to human remains is not cumulatively considerable.

With implementation of Mitigation Measures CUL-1 through CUL-12, as described above, the project would not result in significant impacts to cultural resources. Given the required mitigation for the current project, and required adherence to state and local laws for other projects in the cumulative region, cumulative impacts to cultural resources would be less than significant.

Mitigation Measures

Implement Mitigation Measures CUL-1 through CUL-12.

Significance Determination

Less than Significant Impact with Mitigation

3.4.4 References

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3.6 Energy

This section evaluates the potential for impacts related to energy emitted by construction and operation of the proposed project. This section includes: a description of the existing electricity and energy conditions regionally and in and around the project area; a summary of applicable regulations related to energy; and an evaluation of the potential impacts of the project related to energy, including cumulative impacts.

3.6.1 Environmental Setting

Electricity

Electricity, as 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 for distribution and use. The electricity generated is distributed through a network of transmission and distribution lines commonly called a power grid.

Energy capacity, or electrical power, is generally measured in watts (W), while energy use is measured in watt-hours (Wh). For example, if a light bulb has a capacity rating of 100 W, the energy required to keep the bulb on for 1 hour would be 100 Wh. If ten 100 W bulbs were on for 1 hour, the energy required would be 1,000 Wh or 1 kilowatt-hour (kWh). On a utility scale, the capacity of a generator is typically rated in megawatts (MW), which is 1 million watts, while energy usage is measured in megawatt-hours (MWh) or gigawatt-hours (GWh), which is one billion watt-hours.

Pacific Gas and Electric Company (PG&E) provides electrical and natural gas services to approximately 16 million people throughout its 70,000-square-mile service area, across central, coastal, and Northern California, an area bounded by Humboldt County to the north and Kern County to the south (PG&E 2020). PG&E produces and purchases energy from a mix of conventional and renewable generating sources.

PG&E generates power from a variety of energy sources, including large hydropower (greater than 30 MW), natural gas, nuclear sources, and renewable resources, such as wind, solar, small hydropower (less than 30 MW), and geothermal sources. Approximately 39 percent of PG&E's 2018 electricity purchases were from renewable sources, which is 31 percent greater than the statewide percentage of electricity purchases from renewable sources (PG&E 2019). In 2018, PG&E sold approximately 87,375,000 MWh to customers (PG&E 2018). Refer to **Table 3.6-1** for a summary of electricity use.

TABLE 3.6-1
EXISTING ANNUAL STATE AND REGIONAL ENERGY USE

Source	Amount
Electricity (State/PG&E)[a]	284,436,262 MWh / 87,375,000 MWh
Natural Gas (State/PG&E)[b]	12,327,096,996 MMBtu / 1,016,713,000 MMBtu
Gasoline (Statewide/Kern County)[c]	15,471,000,000 gallons / 396,000,000 gallons
Diesel (Statewide/Kern County)[c]	3,702,083,333 gallons / 225,000,000 gallons

NOTES:
MMBtu = million British thermal units; MWh = megawatt-hours; PG&E = Pacific Gas and Electric Company

SOURCES:

[a] California Energy Commission, California Energy Consumption Database, 2019. Available at https://ecdms.energy.ca.gov/; Pacific Gas and Electric Company, *2018 Integrated Resource Plan*, August 1, 2018. Available at https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/energy-supply/integrated-resource-planning/2018-PGE-Integrated-Resource-Plan.pdf. Accessed July 2020.

[b] Pacific Gas and Electric Company, Supply and Demand Archives. Available at https://www.pge.com/pipeline/operations/cgt_supplydemand_search.page.

[c] California Energy Commission, 2018 California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2019. Available at https://www.energy.ca.gov/data-reports/energy-almanac/transportation-energy/california-retail-fuel-outlet-annual-reporting. Accessed July 2020.

Natural Gas

Natural gas is a combustible mixture of simple hydrocarbon compounds (primarily methane) that is used as a fuel source. Natural gas consumed in California is obtained from naturally occurring reservoirs and delivered through high-pressure transmission pipelines. Natural gas provides almost one-third of California's total energy requirements. Natural gas is measured in terms of both cubic feet and Btu.

PG&E provides natural gas transportation services to "core" customers and to "non-core" customers (industrial, large commercial, and natural gas–fired electric generation facilities) that are connected to its gas system in its service territory. Core customers can purchase natural gas procurement service (natural gas supply) from either PG&E or non-utility third-party gas procurement service providers (referred to as "core transport agents"). When core customers purchase gas supply from a core transport agent, PG&E still provides gas delivery, metering, and billing services to those customers. When PG&E provides both transportation and procurement services, PG&E refers to the combined service as "bundled" natural gas service. Currently, more than 95 percent of core customers, representing nearly 80 percent of the annual core market demand, receive bundled natural gas service from PG&E.

PG&E does not provide procurement service to non-core customers, who must purchase their gas supplies from third-party suppliers. PG&E offers backbone gas transmission, gas delivery (local transmission and distribution), and gas storage services as separate and distinct services to its non-core customers. Access to PG&E's backbone gas transmission system is available for all natural gas marketers and shippers, as well as non-core customers. PG&E also delivers gas to off-system customers (i.e., outside of PG&E's service territory) and to third-party natural gas storage customers.

Transportation Energy

According to the California Energy Commission (CEC), transportation accounted for nearly 41.1 percent of total energy consumption in California during 2017 (CEC 2020). In 2018, 15.4 billion gallons of gasoline and 3.7 billion gallons of diesel fuel were consumed in California (CEC 2018a). Petroleum-based fuels currently account for more than 90 percent of transportation fuel use in California (CEC 2016).

The State is now working on developing flexible 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, total gasoline consumption in California has declined. The CEC predicts that the demand for gasoline will continue to decline over the next 10 years, and there will be an increase in the use of alternative fuels (CEC 2018b). According to fuel sales data from the CEC, fuel consumption in Kern County was approximately 396 million gallons of gasoline and 225 million gallons of diesel fuel in 2018 (CEC 2018a). Refer to Table 3.6-1 for a summary of Statewide fossil fuel consumption in 2018.

3.6.2 Regulatory Setting

Federal

National Energy Conservation Policy Act

The National Energy Conservation Policy Act (NECPA) serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1978, NECPA has been regularly updated and amended by subsequent laws and regulations. This law is the foundation of most federal energy requirements. NECPA established energy-efficiency standards for consumer products and includes a residential program for low-income weatherization assistance, grants and loan guarantees for energy conservation in schools and hospitals, and energy-efficiency standards for new construction. Initiatives in these areas continue today.

Energy Policy Act of 1992

The Energy Policy Act of 1992 was enacted to reduce U.S. dependence on foreign petroleum and improve air quality. This law includes several provisions intended to build an inventory of alternative-fuel vehicles in large, centrally fueled fleets in metropolitan areas. The Energy Policy Act of 1992 requires certain federal, State, and local government and private fleets to purchase a percentage of light-duty alternative fuel vehicles capable of running on alternative fuels each year. Financial incentives are also included. Federal tax deductions are allowed for businesses and individuals to cover the incremental cost of alternative fuel vehicles. The Energy Policy Act of 1992 also requires states to consider a variety of incentive programs to help promote alternative-fuel vehicles.

Energy Policy Act of 2005

The Energy Policy Act of 2005 includes provisions for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing,

tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Executive Order 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), signed in 2007, strengthens the key energy management goals for the federal government and sets more challenging goals than the Energy Policy Act of 2005. The energy reduction and environmental performance requirements of Executive Order 13423 were expanded upon in Executive Order 13514 (Federal Leadership in Environmental, Energy, and Economic Performance), which was signed in 2009.

Corporate Average Fuel Economy 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. Environmental Protection Agency (EPA) jointly administer the CAFE standards. Congress has specified that CAFE standards must be set at the "maximum feasible level" with consideration given to (1) technological feasibility; (2) economic practicality; (3) effect of other standards on fuel economy; and (4) the need for the nation to conserve energy.

Fuel-efficiency standards for medium- and heavy-duty trucks have been jointly developed by EPA and NHTSA. The Phase 1 heavy-duty truck standards applied to combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles for model years 2014-2017, and required a reduction in fuel consumption by 6 to 23 percent over the 2010 baseline, depending on the vehicle type (USEPA 2011). EPA and NHTSA have also adopted the Phase 2 heavy-duty truck standards, which start with model year 2021 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 (USEPA 2016).

In September 2019, EPA finalized the Safer Affordable Fuel-Efficient Vehicles Rule Part One: One National Program and announced its decision to withdraw the Clean Air Act preemption waiver granted to the State of California in 2013 (USEPA 2019).

Influence of the U.S. Department of Transportation, U.S. Department of Energy, and U.S. Environmental Protection Agency on Transportation Energy

On the federal level, the U.S. Department of Transportation, U.S. Department of Energy, and EPA have substantial influence over energy policies related to fuel consumption in transportation. Generally, federal agencies influence transportation energy consumption by establishing and enforcing fuel economy standards for automobiles and light trucks, and by funding projects for energy-related research and development for transportation infrastructure.

State

California Global Warming Solutions Act of 2006

In 2006, Governor Schwarzenegger signed Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006 (codified in the California Health and Safety Code (HSC),

Division 25.5), which focused on reducing GHG emissions in California to 1990 levels by 2020. Under HSC Division 25.5, California Air Resources Board (CARB) has the primary responsibility for reducing the GHG emissions in California; however, AB 32 also tasked the CEC and CPUC with providing information, analysis, and recommendations to CARB regarding strategies to reduce GHG emissions in the energy sector.

In 2016, Governor Brown signed SB 32 and its companion bill AB 197. SB 32 and AB 197 amend HSC Division 25.5 and establish a new climate pollution reduction target of 40 percent below 1990 levels by 2030 and include provisions to ensure that the benefits of State climate policies reach into disadvantaged communities. Please see Section 3.8, *Greenhouse Gas Emissions*, of this Draft EIR for additional details regarding these statutes.

On-Road and Off-Road Vehicle and Equipment Rules

Heavy-Duty Vehicles and Equipment

Several measures have been adopted by the State to control emissions from heavy-duty vehicles and equipment. While the goals of these measures are primarily to reduce public health impacts from diesel emissions, compliance with the regulation has shown an increase in energy savings in the form of reduced fuel consumption from more fuel-efficient engines (Cummins 2014).

In 2004, CARB adopted an Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling to reduce public exposure to diesel particulate matter emissions (Title 13 *CCR* Section 2485). The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure prohibits diesel-fueled commercial vehicles from idling for more than 5 minutes at any given location. While the goal of this measure is primarily to reduce public health impacts from diesel emissions, compliance with the regulation also results in energy savings in the form of reduced fuel consumption from unnecessary idling.

In addition to limiting exhaust from idling trucks, in 2008 CARB approved the Truck and Bus regulation to reduce NO_X, PM10, and PM2.5 emissions from existing diesel vehicles operating in California (13 *CCR* Section 2025). The phased regulation aims to reduce emissions by requiring installation of diesel soot filters and encouraging the retirement, replacement, or retrofit of older engines with newer emission-controlled models. The phasing of this regulation has full implementation by 2023.

CARB also promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower (hp) such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles. The In-Use Off-Road Diesel-Fueled Fleets regulation adopted by CARB on July 26, 2007, aims to reduce emissions by installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models (13 *CCR* Section 2449). The compliance schedule requires full implementation by 2023 in all equipment for large and medium fleets and by 2028 for small fleets.

Light-Duty Vehicles

The transportation sector accounts for more than half of carbon dioxide (CO_2) emissions in California. AB 1493 (commonly referred to as Pavley regulations), enacted on July 22, 2002, requires CARB to set GHG emission standards for new passenger vehicles, light duty trucks, and other vehicles manufactured in and after 2009 whose primary use is non-commercial personal transportation. Phase I of the legislation established standards for model years 2009–2016 and Phase II established standards for model years 2017-2025 (CARB 2020; USEPA 2012). Refer to Section 3.8, *Greenhouse Gas Emissions*, of this Draft EIR for additional details regarding this regulation.

Integrated Energy Policy Report

Senate Bill (SB) 1389 (*Public Resources Code [PRC*] Sections 25300–25323) requires the CEC to prepare a biennial integrated energy policy report that assesses major energy trends and issues facing the electricity, natural gas, and transportation fuel sectors in California, and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the State economy; and protect public health and safety (*PRC* Section 25301(a)).

Renewables Portfolio Standards

The State of California adopted standards to increase the percentage of electricity that retail sellers, including investor-owned utilities and community choice aggregators, must provide from renewable resources. The standards are referred to as the Renewables Portfolio Standards (RPS). The legislation requires utilities to increase the percentage of electricity obtained from renewable sources to 33 percent by 2020 and 50 percent by 2030.

On September 10, 2018, Governor Jerry Brown signed SB 100, which further increased the California RPS and requires retail sellers and local publicly owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by December 31, 2024; 52 percent by December 31, 2027; and 60 percent by December 31, 2030. SB 100 also provides that CARB should plan for 100 percent eligible renewable energy resources and zero-carbon resources by December 31, 2045.

CPUC and the CEC jointly implement the RPS program. The responsibilities of the CPUC include: (1) determining annual procurement targets and enforcing compliance; (2) reviewing and approving renewable energy procurement plan of each investor-owned utility; (3) reviewing contracts for RPS-eligible energy; and (4) establishing the standard terms and conditions used in contracts for eligible renewable energy (CPUC 2020b). Refer to Section 3.8, *Greenhouse Gas Emissions*, of this Draft EIR for additional details regarding this program.

2017 Climate Change Scoping Plan Update

In response to SB 32 and the 2030 GHG reduction target, CARB approved the 2017 Climate Change Scoping Plan Update (2017 Scoping Plan Update) in December 2017 (CARB 2017a). The 2017 Scoping Plan Update outlines the proposed framework of action for achieving the 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990 levels (CARB 2017b).

The 2017 Scoping Plan Update identifies key sectors of the State's implementation strategy, which includes improvements in low-carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. Through a combination of data synthesis and modeling, CARB determined that the target statewide 2030 emissions limit is 260 $MMTCO_2e$, and that further commitments will need to be made to achieve an additional reduction of 50 $MMTCO_2e$ beyond current policies and programs. The cornerstone of the 2017 Scoping Plan Update is an expansion of the Cap-and-Trade Program (discussed further below) to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2030 limit set forth by E.O. B-30-15.

The 2017 Scoping Plan Update's strategy for meeting the State's 2030 GHG target incorporates the full range of legislative actions and State-developed plans that have relevance to the year 2030, including the following, described elsewhere in this section:

- Extending the low-carbon fuel standard (LCFS) beyond 2020 and increasing the carbon intensity reduction requirement to 18 percent by 2030;
- SB 350, which increases the Renewables Portfolio Standard (RPS) to 50 percent by 2030 and requires the CEC to establish annual targets for Statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of Statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by 2030. These targets may be achieved through energy efficiency savings and demand reductions from a variety of programs, including but not limited to appliance and building energy efficiency standards and a comprehensive program to achieve greater energy efficiency standards in existing buildings;
- The 2016 Mobile Source Strategy is estimated to reduce emissions from mobile sources including an 80 percent reduction in smog-forming emissions and a 45 percent reduction in diesel particulate matter from 2016 levels in the Air Basin, a 45 percent reduction in Statewide GHG emissions (from both on-road and off-road mobile sources) and a 50 percent reduction in Statewide consumption of petroleum-based fuels;
- The Sustainable Freight Action Plan to improve freight efficiency and transition to zero emission freight handling technologies (described in more detail below);
- SB 1383, which requires a 50 percent reduction in anthropogenic black carbon and a 40 percent reduction in hydrofluorocarbon and methane emissions below 2013 levels by 2030; and
- AB 398, which extends the State Cap-and-Trade Program through 2030.

California Environmental Quality Act

Under CEQA (*PRC* Section 21100(b)(3)), EIRs are required to discuss the potential significant energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. If the analysis of a proposed project shows that the project may result in significant environmental effects due to the wasteful, inefficient, or unnecessary use of energy, or wasteful use of energy resources, then the EIR must identify mitigation measures to address 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 project size, location, orientation, equipment use, and any renewable energy features that could be incorporated into the project (*CEQA Guidelines* Section 15126.2(b)).

CEQA Guidelines Appendix F lists the energy-related topics that should be analyzed in the EIR, and more specifically identifies the following topics for consideration in the evaluation of energy impacts in an EIR, to the extent the topics are applicable or relevant to the proposed project:

- The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project, including construction, operation, maintenance, and/or removal. If appropriate, the energy intensiveness of materials may be discussed.
- The effects of the project on local and regional energy supplies and on requirements for additional capacity.
- The effects of the project on peak and base-period demands for electricity and other forms of energy.
- The degree to which the project complies with existing energy standards.
- The effects of the project on energy resources.
- The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

The effects of the project relevant to each of these issues are addressed in this section.

Local

Kern County General Plan Energy Element

The Energy Element of the Kern County General Plan (Kern County 2009) contains applicable goals, policies, and policies to energy, but none specific to the project and/or water infrastructure.

3.6.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to energy. The proposed project would have a significant impact if it would:

1. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.
2. Conflict with or obstruct a State or local plan for renewable energy or energy efficiency.
3. Result in cumulatively considerable impacts to energy.

Methodology

Project construction would consume energy from transportation fuels (e.g., diesel and gasoline) used for haul trucks, heavy-duty construction equipment, and construction workers traveling to and from the project area. Electricity and natural gas would not be used during construction.

Construction activities could vary substantially from day to day, depending on the phase and specific type of construction activity and the number of workers and vendors who would travel to the project area. This analysis considered these factors and provides the estimated maximum construction energy consumption for the purposes of evaluating the associated impacts on energy resources.

Transportation Fuels

Transportation fuels would be consumed for transportation of construction workers and materials to and from the project area, and operation of construction equipment at the project sites throughout the construction phases.

Fuel consumption by on-site heavy-duty construction equipment was calculated based on the equipment mix estimated by the project applicant and usage factors provided in the CalEEMod construction output files included in Appendix C. The total horsepower was then multiplied by fuel usage estimates per horsepower-hours from the CARB off-road vehicle (OFFROAD) model (CARB 2017c).

Fuel consumption by construction on-road worker, vendor, and delivery/haul trucks was calculated using the trip rates and distances consistent with the air quality and GHG emissions modeling worksheets and CalEEMod construction output files. Total VMT for these on-road vehicles were then calculated for each type of construction-related trip and divided by the corresponding county-specific miles per gallon factor, using CARB's EMFAC2017 model. The model was used to calculate fuel consumed based on the total annual VMT for each vehicle type.

A combination of CalEEMod-assumed trip lengths and client-provided specific trip lengths was used for worker commutes, vendor and concrete trucks, and haul truck trips. Consistent with CalEEMod, construction worker trips were assumed to include a mix of light-duty gasoline automobiles and light-duty gasoline trucks. Construction vendor trucks were assumed to be a mix of medium-heavy-duty and heavy-duty diesel trucks, and haul trucks were assumed to be heavy-duty diesel trucks. Refer to **Appendix E** for detailed energy calculations.

The energy usage required for construction of the proposed project was estimated based on the number and types of equipment that would be used during all construction phases by assuming a conservative estimate of construction activities (i.e., maximum daily equipment usage levels). Energy for construction worker commuting trips was estimated based on the predicted number of workers for the various phases of construction and the estimated VMT based on the conservative values in the CalEEMod and EMFAC2017 models.

The estimated fuel economy for heavy-duty construction equipment was based on fuel consumption factors from the CARB OFFROAD emissions model, a State-approved model for estimating emissions from off-road heavy-duty equipment. The estimated fuel economy for haul trucks, vendor trucks, concrete trucks, and worker commute vehicles was based on fuel consumption factors from CARB's EMFAC2017 emissions model, a State-approved model for estimating emissions from on-road vehicles and trucks.

Operation

Operational energy impacts were assessed based on the increase in energy demand assuming that the project is not replacing any existing uses and all project-generated energy is net new. The assumptions used here are the same as those used in Section 3.8, *Greenhouse Gas Emissions*. Natural gas would not be used for operations and is not considered in the following analysis.

Electricity

Electrical power for the proposed project is expected to be provided by PG&E. The project's estimated electricity demand was analyzed relative to the State's existing and planned energy supplies in 2027 (the closest projected year to the first full year of project operation) to determine whether PG&E would be able to meet the proposed project's energy demands. Annual consumption of electricity was calculated based on the estimated annual flow of water through the pump stations and the amount of recharge and recovery from the recovery wells. The total annual volume for water was then multiplied by the estimated electricity intensity factors for pump stations and recovery wells.

Transportation Fuels

Energy demand from employees, vendors and suppliers, and haul trucks traveling to and from the project area was estimated based on the predicted number of trips to and from the project area consistent with the analysis in Section 3.8, *Greenhouse Gas Emissions*, and the estimated GHG emissions for the proposed project.

Based on the proposed project's annual mobile-source GHG emissions, gasoline and diesel consumption rates were calculated using the county-specific vehicle fleet mixes in EMFAC2017 and a standard conversion factor from GHG emissions to gallons of fossil fuels (i.e., gasoline, diesel, and natural gas). Operations would also require offroad equipment for weed and pest control and earthwork operations. Fuel use from offroad equipment is calculated using the same methodology described for offroad construction equipment, above. Supporting calculations are provided in Appendix E.

Impact Analysis

Consumption of Energy Resources

Impact 3.6-1: The proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. (*Less than Significant Impact*)

Construction

During construction of the proposed project, energy would be consumed primarily in the form of fossil fuels for powering off-road construction vehicles and equipment on the project area, for travel by construction workers to and from the project area, and for delivery and haul truck trips (e.g., hauling of demolished and excavated material to off-site reuse and disposal facilities). Electricity and natural gas would not be used.

Table 3.6-2 summarizes the estimated annual average consumption of gasoline fuel and diesel fuel during project construction. Note that construction energy use is presented as an annual average of construction activities.

TABLE 3.6-2
ANNUAL ENERGY USE DURING PROJECT CONSTRUCTION

	Annual Average Quantity during Construction[a]	
Energy Type	**Project Energy Usage[b]**	**Unit of Measure**
Gasoline		
On-Road Construction Equipment	9,423	Gallons
Off-Road Construction Equipment	0	Gallons
Total Annual Gasoline	**9,423**	**Gallons**
Diesel		
On-Road Construction Equipment	41,625	Gallons
Off-Road Construction Equipment	141,519	Gallons
Total Annual Diesel	**182,784**	**Gallons**

NOTES:
Detailed calculations are provided in Appendix E.
[a] Totals may not add up due to rounding of decimals.
SOURCES: Data compiled by Environmental Science Associates in 2020; CalEEMod, 2020; EMFAC, 2017

Table 3.6-2 reports the amount of petroleum-based transportation energy that could potentially be consumed annually during construction of the proposed project, based on the conservative set of assumptions provided in Appendix E. During project construction, on- and off-road vehicles would consume an estimated annual average of approximately 9,423 gallons of gasoline and 182,784 gallons of diesel. For informational purposes only, and not for the purpose of determining significance, total fuel usage during project construction would represent approximately 0.0001 percent of the state's 2018 annual on-road gasoline-related energy consumption and 0.005percent of its 2018 annual diesel fuel-related energy consumption, as shown in Appendix E (CEC 2018a).

Transportation fuels (gasoline and diesel) are produced from crude oil, which can be domestic or imported from various regions around the world. Based on current proven reserves, crude oil production would be sufficient to meet more than 50 years of worldwide consumption (BP, 2019). The proposed project would comply with CAFE fuel economy standards, which would result in more efficient use of transportation fuels (lower consumption). Vehicles used for project-related trips would also comply with AB 1493 and the LCFS, which are designed to reduce vehicular GHG emissions, but would also result in additional fuel savings.

Construction of the proposed project would use fuel-efficient equipment consistent with federal and State regulations, such as fuel-efficiency regulations in accordance with CARB's Pavley Phase II standards; the anti-idling regulation in accordance with 13 *CCR* Section 2485; and fuel

requirements for stationary equipment in accordance with 17 *CCR* Section 93115 (concerning Airborne Toxic Control Measures). Project construction would also comply with State measures to reduce the inefficient, wasteful, and unnecessary consumption of energy, such as petroleum-based transportation fuels. While these regulations are intended to reduce construction emissions, compliance with the anti-idling and emissions regulations discussed above would also result in fuel savings from the use of more fuel-efficient engines.

As analyzed above, construction would use energy for on-site activities, for construction worker travel, and to transport construction materials and demolition debris to and from the project area. Idling restrictions and the use of cleaner, energy-efficient equipment would result in relatively less fuel combustion and energy consumption. Thus, the proposed project's construction-related energy use would be minimized. Therefore, construction of the proposed project would not result in the wasteful, inefficient, or unnecessary consumption of energy, and construction-related impacts would be less than significant**.**

Operations

During operations energy would primarily be consumed in the form of electricity for water management activities, such as pumping, groundwater extraction, conveyance, and treatment (CEC 2005). Energy intensity (kwh/AF) is a measure of the amount of energy required to perform water-related operational tasks. Once constructed, the proposed project would involve recharge of source waters and extraction of groundwater, and conveyance of water resources to/from the proposed project via local and regional canals, channels, and the California Aqueduct. The potential impact of this action is based on the amount of energy required to convey, recharge, and extract water. The project would also consume energy in the form of gasoline and diesel fuel for powering on- and off-road equipment used for general maintenance, weed and pest control, and earthwork operations.

The majority of operational activity associated with the proposed project would involve the passive, gravity driven movement of water through pipes and basins. During the recharge phase, electric pumps would be required to boost water to/from recharge basins; the pumps would be powered by the existing electrical grid served by PG&E. Recovery operations would involve extraction of water at 12 proposed recovery wells. Recovery activities would also be powered by the existing electrical grid. The maximum amount of energy expended per AF of water (kwh/AF), total annual electricity use, and annual fossil fuel consumption at the project area is shown in **Table 3.6-3**.

TABLE 3.6-3
ESTIMATED MAXIMUM OPERATIONAL ENERGY CONSUMPTION

	Annual Energy Consumption	Energy Intensity
Electricity		
Pump Stations (100,000 AF/pump/year)	9,000 MWh/year	0.03 MWh/AF
Recovery Wells (50,000 AF/year)	30,000 MWh/year	0.6 MWh/AF
Total Electricity	**39,000 MWh/year**	**-**
Gasoline		
On-Road Vehicles	555 gallons/year	-
Diesel		
On-Road Vehicles	5,128 gallons/year	-
Off-Road Vehicles	24,626 gallons/year	-
Diesel Total	**29,754 gallons/year**	**-**

SOURCE: Rosedale 2020, ESA 2020

Typically, recharge activities and recovery activities would not occur simultaneously. In some years, neither recharge nor recovery would occur. Energy consumption thus would not necessarily be regular or sustained over time. With respect to energy intensity, typical energy use associated with groundwater supply and conveyance ranges from 0.225 to 0.585 MWh/AF, as a national average (CEC 2005). The average energy intensity for the proposed project falls within this range, and is estimated at 0.315 MWh/AF for recharge activities and recovery activities. According to the CEC, the energy intensity of different groundwater sources varies, depending on both the depth at which groundwater resides and the efficiency of the pumps and motors used to pump it. In addition, in the context of energy intensity and benefits to the state, the primary benefit of groundwater is the ability to offset the high energy intensity of SWP deliveries in summer and fall. Groundwater banking and conjunctive use projects promote such strategies by recharging imported water during wet periods for later extraction during dry periods, either summer/fall months or drought periods when surface supplies are low (CEC 2005).

Renewable energy accounted for 39 percent of PG&E's overall energy mix in 2018 (PG&E 2019). Thus, electricity provided to meet the project's energy demand would include some mix of renewable energy. Based on data collected by the CEC's California Energy Consumption Database, the State's total electricity consumption for 2018 (the latest data available) was 284,436,262 MWh of electricity (CEC 2018c). As such, the project-related net increase in annual electricity consumption, 39,000 MWh, would represent approximately 0.014 percent of Statewide electricity. Furthermore, Statewide energy demand for 2027 (the closest projected year to the proposed project's opening year) is estimated at 317,491,000 MWh (CEC 2018c). The project's future energy use would represent about 0.012 percent of future State consumption and would be within projected electricity supplies.

During operation, project-related vehicle use would consume petroleum-based fuels for vehicular travel to and from the project area and off-road equipment activity for weed and pest control and earthwork operations. The vehicle fleet that would be used by project employees would consist

primarily of light-duty automobiles and light-duty trucks, which are subject to fuel-efficiency standards. Other trips to the project area would include trips associated with weed and pest control and earthwork operations and would include medium and heavy duty trucks. Most of these trips would also be subject to fuel-efficiency standards and/or compliance with anti-idling regulations for medium- and heavy-duty vehicles.

As reported in Table 3.6-3, the project's mobile sources would result in an annual net increase in petroleum-based fuel usage of approximately 555 gallons of gasoline and 29,754 gallons of diesel. Based on the California Energy Commission's *California Annual Retail Fuel Outlet Report*, residents and employees Statewide consumed 15,471,000,000 gallons of gasoline and 3,702,083,333 gallons of diesel and the County consumed approximately 396,000,000 gallons of gasoline and 225,000,000 gallons of diesel. The proposed project would account for less than 0.00001 percent of Statewide consumption for gasoline, 0.0008 percent for diesel, and for 0.0001 percent and 0.01 percent of countywide consumption of gasoline and diesel, based on the available county fuel sales data for the year 2018.

Transportation fuels (gasoline and diesel) are produced from crude oil, which can be domestic or imported from various regions around the world. Based on current proven reserves, crude oil production would be sufficient to meet more than 50 years of worldwide consumption (BP, 2019). Fuels used for vehicle trips resulting from the proposed project would be required to comply with CAFE fuel economy standards, which would result in more efficient use of transportation fuels (lower consumption). Vehicles used for project-related vehicle trips would also comply as applicable with AB 1493 and the LCFS, which are designed to reduce vehicular GHG emissions, but would also result in additional fuel savings.

Implementation of the proposed project would intermittently increase demands on local energy providers. The demands to the electrical grid would not be as constant as residential, commercial or industrial uses due to the irregular use of the recharge and recovery facilities. In addition, it is anticipated that the proposed pump stations would utilize high-efficiency motors with variable frequency drives (VFD) that would minimize large electrical demand flickers at start up and maximize energy efficiency due to the ability to match pump speed with exact flow requirements.

It is not anticipated that additional power generation facilities would be required to serve the proposed project, or that the demand would exceed capacity of energy providers. The Authority would be required to engage PG&E through the normal power service application process to ensure adequate power supplies are provided to the project sites. In addition to the normal service application process, the Authority plans to provide PG&E with an overall project feasibility design at least 6 months prior to any service requests to allow for better discussion and system planning between the Authority and PG&E's engineering and planning division.

For the reasons described above, operation of the proposed project would not result in the wasteful, inefficient, and unnecessary consumption of energy, and the impact would be less than significant**.**

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

State and Local Energy Plans

Impact 3.6-2: The proposed project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. (*Less than Significant Impact*)

As of 2018, the electricity provider for the project area, PG&E, generates 39 percent of electricity from renewable sources (PG&E 2018). Under SB 100, PG&E would have to increase its renewable sources for electricity to 50 percent by year 2026, 52 percent by year 2027, 60 percent by year 2030 and 100 percent by year 2045. While the project would not actively be involved in the procurement of increasingly cleaner electricity through SB 100, the project would receive power from PG&E. PG&E and all utility providers are required to comply with the SB 100 mandate, thus the project would not conflict with the State's goals of more procurement of cleaner energy.

The Heavy-Duty Vehicle and Light-Duty vehicle rules have been established to reduce CO_2 emissions and, consequently, the combustion of fossil fuels. The proposed project would not involve the manufacture of vehicles or production of vehicle fuels. However, vehicles that are purchased and used within the project area would comply with any vehicle and fuel standards that the CARB adopts or has adopted. Therefore, the construction and operation of the proposed project would not conflict with these regulations, and the project would not conflict with or obstruct a State or local plan for energy efficiency. Impacts would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Cumulative Impacts

Impact 3.6-3: Concurrent construction and operation of the proposed project and related projects in the geographic scope would not result in cumulative short-term and long-term impacts to energy resources. (*Less than Significant Impact*)

The geographic area for cumulative energy impacts is the state of California. Past, present, and future development projects contribute to the State's energy impacts. If a project is determined to have a significant energy impact, it is concluded that the impact would be cumulatively considerable. As discussed under Impacts 3.6-1 and 3.6-2, the proposed project would not result in

significant energy impacts or conflict with or obstruct a State or local plan for energy efficiency. The proposed project, therefore, would not have a cumulatively considerable contribution to a significant cumulative energy impact. As a result, this impact would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

3.6.4 References

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3.7 Geology and Soils

This section addresses the geology, soils, and paleontological resources impacts associated with construction and operation of the proposed project. This section includes: a description of the existing geology, soils, and paleontological resource conditions at the proposed project area (which includes the Phase 1, Phase 2, and Kern Fan Conveyance Facilities areas); a summary of applicable regulations related to geology and soil hazards, and paleontological resources; and an evaluation of the potential impacts of the proposed project related to the geologic and soil conditions and the paleontological resources at the proposed project area and in the surrounding area, including cumulative impacts.

To inform the project design, the investigations listed below have been conducted to investigate site conditions and, identify potential issues, and provide recommendations to address those issues. The information provided in the listed reports are the primary source of information for this section.

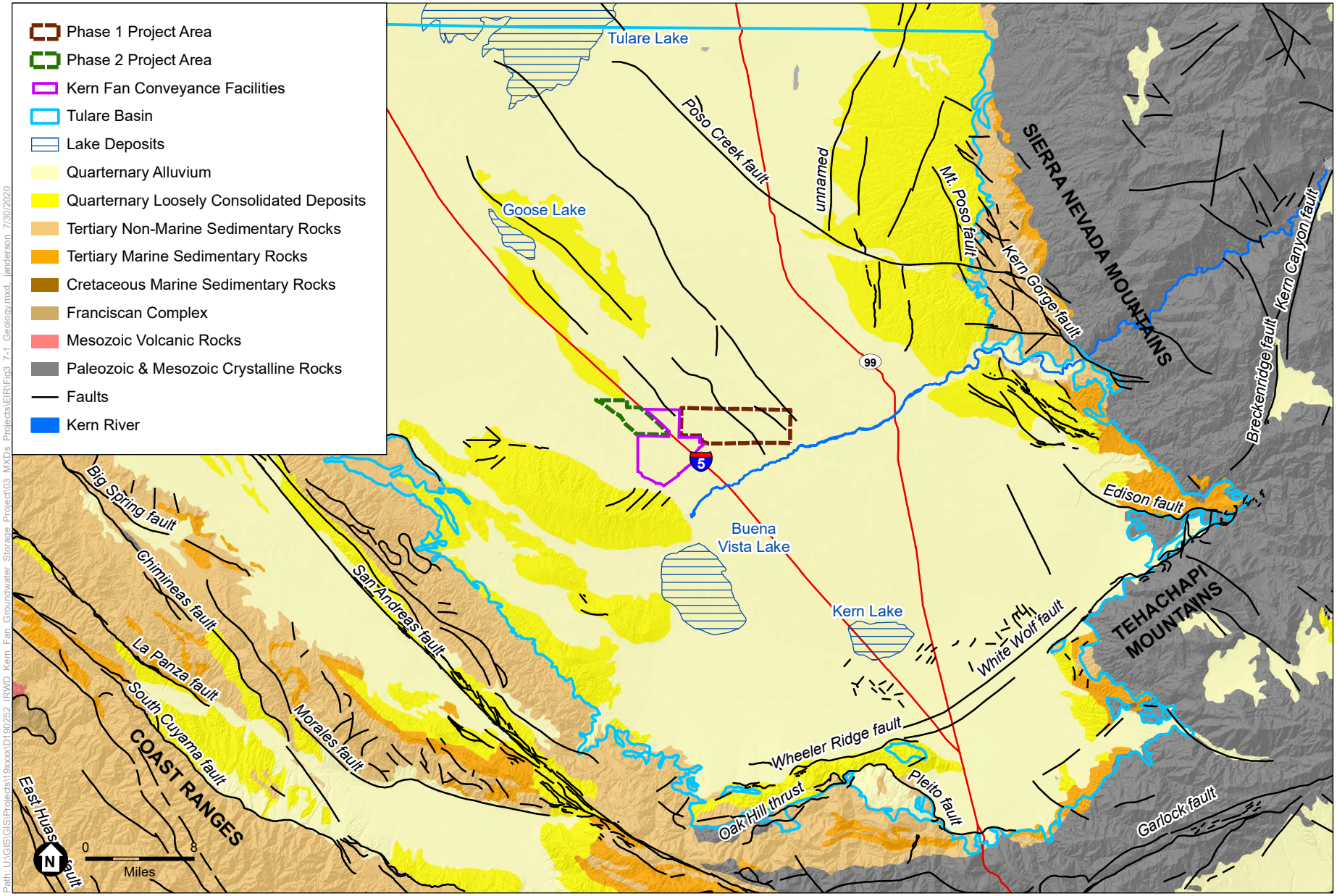
- Kleinfelder West, Inc., 2010. *Irvine Ranch Water District Grimmway Property, Kern County, CA Property Assessment Report*.
- Thomas Harder & Co. (THC), 2011. Hydrogeological Impact Evaluation Related to Operation of the Kern Water Bank and Pioneer Project. December 5.
- Thomas Harder & Co. (THC), 2015. *Draft Proposed Stockdale Integrated Banking Project – Analysis of Potential Groundwater Level Changes from Recharge and Recovery at the Stockdale West and Stockdale East Facilities*. Prepared for Rosedale-Rio Bravo Water Storage District and Irvine Ranch Water District. January 23, 2015.
- Environmental Science Associates (ESA), 2020. *Paleontological Resources Assessment Report*. July.

3.7.1 Environmental Setting

Regional and Local Geology

The project area lies within the region of California referred to as the Great Valley geomorphic province (CGS 2002).[1] The Great Valley geomorphic province is a long alluvial plain about 50 miles wide and approximately 400 miles long running through central California. The Great Valley can be further divided into the northern Sacramento Valley and the southern San Joaquin Valley. The project area is located within the San Joaquin Valley, which is flanked by the Sierra Nevada Range about 20 miles to the east, and the Coast Range about 20 miles to the west, as shown on the geologic map of the area in **Figure 3.7-1**.

[1] A geomorphic province is an area that possesses similar bedrock, structure, history, and age. California has 11 geomorphic provinces (CGS, 2002).



SOURCE: Mapbox; Kern County; Source is THandC, 2015.
*Geologic units modified from USGS Open-File Report 2005-1305
**Lake Deposits from California Geological Survey Geologic Atlas of California Map No. 002
1:250:000 scale, Compiled by Arthur R. Smith, 1964

Kern Fan Groundwater Storage Project

Figure 3.7-1

Geology of Southern Tulare Basin

ESA

The project area is located in the Tulare Basin, which is the southernmost extension of the San Joaquin Valley, a geographically significant structural depression that extends from the City of Stockton on the north to the Tehachapi Mountains on the south (THC 2011). The Tulare Basin is bounded by crystalline rocks of the Sierra Nevada to the east, crystalline rocks of the Tehachapi Mountains to the south and southeast, and Tertiary marine rocks of the Coast Ranges to the southwest.

The structural depression in the Tulare Basin is filled with marine and nonmarine sediments, which extend to depths of more than 20,000 feet below the Buena Vista Lake bed (USGS 1972). The deepest sediments were deposited within a marine environment associated with an inland sea that inundated the valley between 200 million years ago (Jurassic Period) and 2 million years ago (end of the Tertiary Period). The deeper marine sediments are overlain by up to 2,400 feet of nonmarine continental deposits associated with Quaternary (2 million years to present) lacustrine (i.e., lake) and alluvial deposition (USGS 1995). The current depositional environment consists of multiple coalescing alluvial fans along the basin margins with localized lacustrine deposits at the terminus of the fans in the central portion of the basin. Until recently, multiple lakes have existed in the lowest portions of the Tulare Basin, including Tulare Lake, Goose Lake, Kern Lake, and Buena Vista Lake.

The project area is located on the flat distal portions of the alluvial fan deposited by the Kern River as it flows out of the Sierra Nevada Mountains on the east side of the Tulare Basin. Land surface elevations range from about 300 to 350 feet above mean sea level (msl) in the Phase 1 area, about 280 to 290 feet above msl for the Phase 2 area, and about 290 to 315 feet above msl in the Kern Fan Conveyance Facilities area.

Geologic units of the Tulare Basin include, in order of youngest to oldest (THC 2011):

- Quaternary Alluvium - Younger and Older alluvium are difficult to distinguish and are generally grouped together as Quaternary Alluvium. Together with the Younger Alluvium, the Quaternary Alluvium is up to 2,400 feet thick. The Younger Alluvium and Flood Plain Deposits are recent sediments deposited in, and adjacent to, active stream and river channels and in the areas of historical lakebeds. River channel sediments, particularly near the basin margins, are predominantly sand and gravel. Flood plain deposits contain a higher percentage of silt and clay relative to sand and gravel, particularly at the distal portions of the Kern River fan and in the areas of historical lakebeds. The greatest thickness of Younger Alluvium is at the eastern and southern basin boundaries, where it is as much as approximately 150 feet thick. The Older Alluvium consists of Pleistocene (2 million to 10,000 years before present) sediments composed of unconsolidated alluvial fan deposits and stream and terrace deposits. The water to be banked by this project would be stored within the aquifer within the Quaternary Alluvium and the underlying Tulare Formation, described below.
- Tulare Formation – This formation underlies the Quaternary Alluvium at the project area. The Tulare Formation is alluvial in nature and is up to 2,200 feet thick. The Tulare Formation includes the Corcoran Clay, a regional confining clay that has been mapped throughout much of the San Joaquin Valley. However, the Corcoran Clay is not continuous beneath the project area.
- Olcese and Santa Margarita Formations – These Tertiary nonmarine and marine sandstone and siltstone formations are below the part of the aquifer system that would be used to store banked water under this project.

- Granitic Crystalline Basement – Mesozoic granitic rocks that compose the Sierra Nevada batholith form the basement of the San Joaquin Valley.

Soils

The project area is generally covered with fine-grained silty sand to sandy silt containing about 50 to 75 percent sand particles (Kleinfelder 2010). Section 3.4, *Biological Resources*, provides a detailed description of the 19 soil units present within the project area. Overall, soils on the project area are deep to very deep, well drained, with slow to moderately rapid permeability Due to the high permeability of these soils, there is very low surface runoff potential and, therefore, low susceptibility to fluvial erosion (Kleinfelder 2010). However, each of these soil types is moderately susceptible to wind erosion when groundcover is not present. Additionally, the clay content of certain units (i.e., Wasco fine sandy loam, the Wasco sandy loam, and the Kimberlina fine sandy loam) may be moderately susceptible to shrinkage or swelling.

Regional Faults

Faults within the vicinity of the project area include the San Andreas, White Wolf, Kern Canyon, Garlock, and the Buena Vista fault as well as numerous unnamed faults and faults associated with these major faults (CGS 2010). **Figure 3.7-2** illustrates the faults in the vicinity of the project area.

The San Andreas Fault, located approximately 25 miles southwest of the project area, is a right-lateral strike-slip fault[2] that follows the southwestern foothills of the Temblor Range within the vicinity of the project area before bending inland across the Tehachapi Mountains towards the Antelope Valley. The San Andreas is the major active fault in California and was formed due to the interaction between the Pacific Plate (to the west) and the North American Plate (to the east).

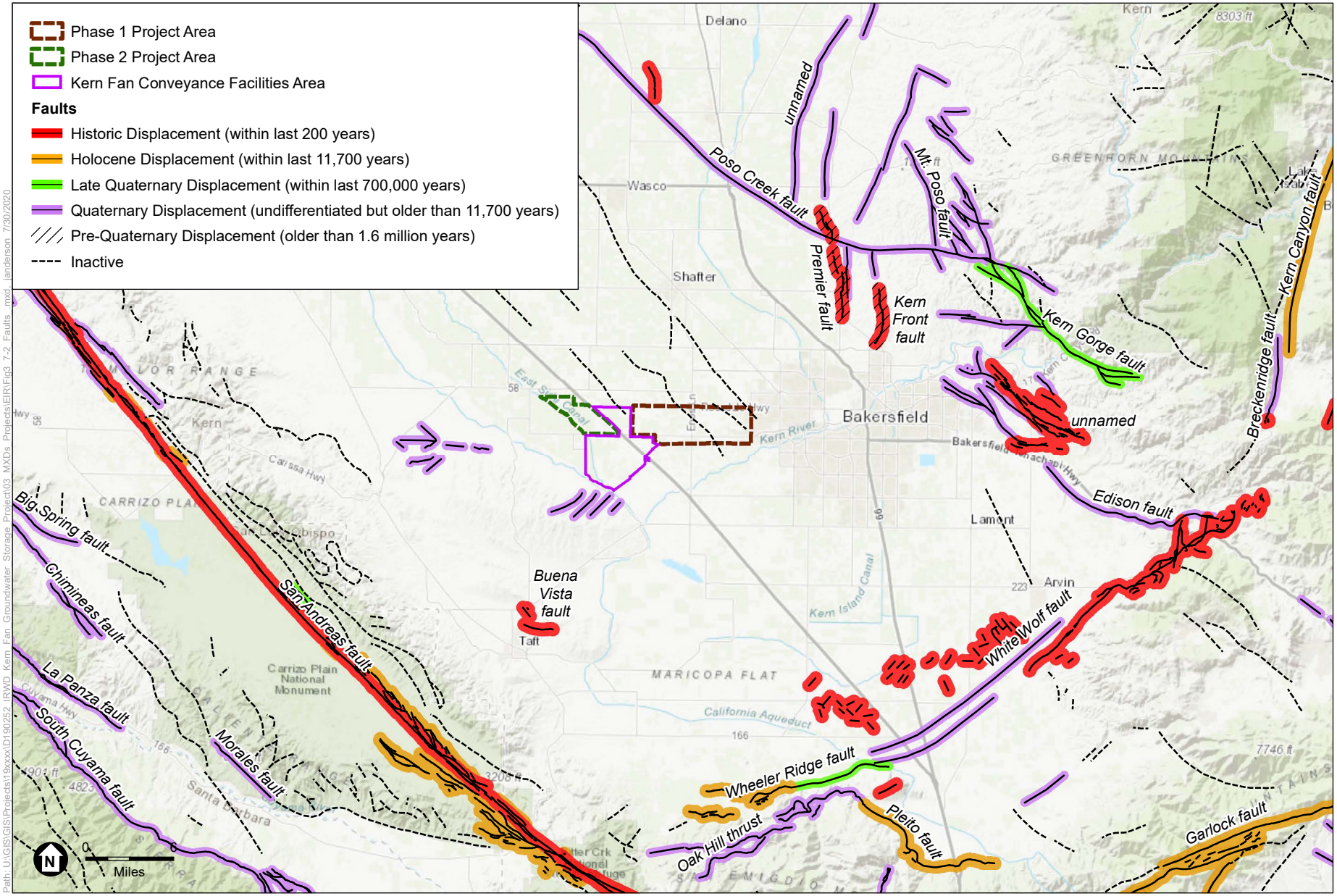
The White Wolf Fault, located approximately 20 miles south of the project area, is a left-lateral oblique-reverse fault[3] that accommodates uplift caused by a compressional bend in the San Andreas Fault. The Kern Front and Premier Faults, located approximately 15 miles northeast of the project area, are dip-slip faults[4] similar to the San Andreas Fault and is generally regarded as a narrow, brittle fault zone.

The Garlock Fault, located approximately 40 miles southeast is a left-lateral strike-slip fault and intersects with the San Andreas Fault in Antelope Valley, California. The motion of the Garlock Fault causes deflection in the San Andreas and deforms it slightly into a curve. The Garlock is the second largest fault in California behind the San Andreas.

2 "Right-lateral" movement in a fault is if you were to stand on the fault and look along its length, the right block moves toward you and the left block moves away. A "strike-slip" fault is a fault in which surfaces on opposite sides of the fault plane have moved horizontally and parallel to the strike of the fault.

3 "Left-lateral" movement in a fault is if you were to stand on the fault and look along its length, the left block moves toward you and the right block moves away. An "oblique-reverse fault" is a type of fault formed when the hanging wall fault block moves up along a fault surface relative to the footwall and its trend is oblique to the strike.

4 Dip-slip movement is movement only along a vertical plane.



SOURCE: Mapbox; CGS, 2010.

Kern Fan Groundwater Storage Project

Figure 3.7-2
Regional Faults

ESA

The Buena Vista fault, located approximately 15 miles southwest of the project area, is a relatively short segmented fault that has experienced active creep that is likely related to oil extraction.[5] All of these faults are currently active, as defined below, and may cause significant ground shaking and surface fault rupture.

Seismicity

The project area is located in a seismically active region of California that contains both Holocene-active (i.e., rupture within last 11,700 years), pre-Holocene (i.e., no rupture within last 11,700 years), and age-undermined (i.e., age of last rupture has not been determined) faults (CGS 2018). Throughout the project region, there is the potential for damage resulting from movement along any one of a number of the active faults, seismic shaking, and seismically induced ground failures (e.g., liquefaction). The proposed project is not located within a fault-rupture hazard zone, as defined by the Alquist-Priolo Earthquake Fault Zoning Act (CGS 2020).

In the past 100 years, there have been a number of earthquakes of magnitude 5.0 or larger reported on the active San Andreas, Garlock, and White Wolf Faults, as well as unknown or unspecified faults (SCEC 2013). Earthquake magnitudes of less than 4.9 generally do not result in significant damage, but magnitudes of 5.0 or greater can cause minimal to major damage to buildings depending on quality of construction and magnitude of the earthquake. **Table 3.7-1** lists historic earthquakes of magnitude 5.0 or greater in the vicinity of Kern County.

TABLE 3.7-1
HISTORIC EARTHQUAKES MAGNITUDE 5.0 OR GREATER IN KERN COUNTY AREA

Name	Date/Time	Fault	Location	Magnitude
Walker Pass Earthquake	March 15, 1946	Unknown	5 miles NNW of Walker Pass	6.0
Kern County Earthquake	July 21, 1952	White Wolf	23 miles S of Bakersfield	7.5
Parkfield Earthquake	June 27, 1966	San Andreas	6 miles NW of Parkfield	6.0
Tejon Ranch Earthquake	June 10, 1988	Unknown	32 miles SSE of Bakersfield	5.4
Mojave Earthquake	July 11, 1992	Garlock	50 miles E of Bakersfield	5.7
Wheeler Ridge Earthquake	May 27, 1993	Unknown	15 miles SSW of Bakersfield	5.2
Wheeler Ridge Earthquake	April 16, 2005	Unknown	26 miles SSW of Bakersfield	5.2

Seismic Hazards

Surface Fault Rupture

Seismically-induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude, sense, and nature of fault rupture can vary for different faults or even along different segments of the same fault. Ground rupture is considered more likely along active faults.

[5] Fault creep is the slow continual deformation of bedrock across a fault without evidence of displacement from a single earthquake event.

The project area is not within an Alquist-Priolo Fault Rupture Hazard Zone, as designated through the Alquist-Priolo Earthquake Fault Zoning Act, and no mapped active faults are known to pass through the immediate project vicinity (CGS 2020). Therefore, the risk of ground rupture at the sites is considered very low.

Ground Shaking

Areas most susceptible to intense ground shaking are those located closest to an earthquake-generating fault, and areas underlain by thick, loosely unconsolidated and saturated sediments. Ground movement during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material.

While the earthquake magnitude is a measure of the energy released in an earthquake, intensity is a measure of the ground shaking effects at a particular location. Areas underlain by bedrock typically experience less severe ground shaking than those underlain by loose, unconsolidated materials. Unconsolidated materials, even when located relatively distant from faults, can intensify ground shaking.

The Modified Mercalli Intensity Scale assigns an intensity value based on the observed effects of groundshaking produced by an earthquake. Unlike measures of earthquake magnitude and PGA, the Modified Mercalli Intensity Scale is qualitative in nature in that it is based on actual observed effects rather than measured values. Similar to peak ground acceleration (PGA), Modified Mercalli values for an earthquake at any one place can vary depending on the earthquake's magnitude, the distance from its epicenter, the focus of its energy, and the type of geologic material. The Modified Mercalli values for intensity range from I (earthquake not felt) to XII (damage nearly total), and intensities ranging from IV to X can cause moderate to significant structural damage. Because the Modified Mercalli scale is a measure of groundshaking effects, intensity values can be correlated to a range of average PGA values, as shown in **Table 3.7-2.**

Ground shaking intensity in the project area is anticipated to be approximately equivalent to MMI VII to IX (strong to very strong) ground shaking. This MMI range is assumed because MMI for the Bakersfield area was modeled for the magnitude 7.9 Fort Tejon Earthquake of 1857 (the largest recorded earthquake in the area) and this range is what the model produced (Cal OES,2018). Ground shaking of this range of intensity would likely cause some degree of damage to project facilities; however, well-designed structures are not anticipated to experience serious damage or collapse.

TABLE 3.7-2
MODIFIED MERCALLI INTENSITY SCALE

Intensity Value	Intensity Description	[a]Average Peak Ground Acceleration
I	Not felt	< 0.0017 g
II	Felt by people sitting or on upper floors of buildings	0.0017 to 0.014 g
III	Felt by almost all indoors. Hanging objects swing. Vibration like passing of light trucks. May not be recognized as an earthquake.	0.0017 to 0.014 g
IV	Vibration felt like passing of heavy trucks. Stopped cars rock. Hanging objects swing. Windows, dishes, doors rattle. Glasses clink. In the upper range of IV, wooden walls and frames creak.	0.014 to 0.039 g
V (Light)	Felt outdoors. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing. Pictures move. Pendulum clocks stop.	0.035 to 0.092 g
VI (Moderate)	Felt by all. People walk unsteadily. Many frightened. Windows crack. Dishes, glassware, knickknacks, and books fall off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster, adobe buildings, and some poorly built masonry buildings cracked. Trees and bushes shake visibly.	0.092 to 0.18 g
VII (Strong)	Difficult to stand or walk. Noticed by drivers of cars. Furniture broken. Damage to poorly built masonry buildings. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices, unbraced parapets and porches. Some cracks in better masonry buildings. Waves on ponds.	0.18 to 0.34 g
VIII (Very Strong)	Steering of cars affected. Extensive damage to unreinforced masonry buildings, including partial collapse. Fall of some masonry walls. Twisting, falling of chimneys and monuments. Wood-frame houses moved on foundations if not bolted; loose partition walls thrown out. Tree branches broken.	0.34 to 0.65 g
IX (Violent)	General panic. Damage to masonry buildings ranges from collapse to serious damage unless modern design. Wood-frame structures rack, and, if not bolted, shifted off foundations. Underground pipes broken.	0.65 to 1.24 g
X (Very Violent)	Poorly built structures destroyed with their foundations. Even some well-built wooden structures and bridges heavily damaged and needing replacement. Water thrown on banks of canals, rivers, lakes, etc.	> 1.24 g
XI (Very Violent)	Few, if any, masonry structures remain standing. Bridges destroyed. Rails bent greatly. Underground pipelines completely out of service.	> 1.24 g
XII (Very Violent)	Damage nearly total. Practically all works of construction are damaged greatly or destroyed. Large rock masses displaced. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown into the air.	> 1.24 g

NOTES:

[a] Value is expressed as a fraction of the acceleration due to gravity (g). Gravity (g) is 9.8 meters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

SOURCES: ABAG 2016; CGS 2002.

Liquefaction and Lateral Spreading

Liquefaction is the rapid loss of shear strength experienced in saturated, predominantly granular soils below the groundwater level during strong earthquake groundshaking and occurs due to an increase in pore water pressure. Liquefaction-induced lateral spreading is defined as the finite, lateral displacement of gently sloping ground as a result of pore-pressure buildup or liquefaction in a shallow underlying deposit during an earthquake (VT 2013). The occurrence of this phenomenon is dependent on many complex factors, including the intensity and duration of groundshaking, particle-size distribution, and density of the soil.

The potential damaging effects of liquefaction include differential settlement, loss of ground support for foundations, ground cracking, heaving and cracking of structure slabs due to sand boiling, and buckling of deep foundations due to ground settlement. Dynamic settlement (i.e., pronounced consolidation and settlement from seismic shaking) may also occur in loose, dry sands above the water table, resulting in settlement of and possible damage to overlying structures. In general, a relatively high potential for liquefaction exists in loose, sandy soils that are within 50 feet of the ground surface and are saturated (below the groundwater table). Lateral spreading can move blocks of soil, placing strain on levees and roads that can lead to ground failure.

Detailed liquefaction mapping has not been prepared for Kern County (KCFD 2012). According to the Kern County Fire Department Office of Emergency Services, the project area is not in an area with a shallow water table and is not likely to be susceptible to liquefaction. However, the groundwater table does fluctuate greatly in association with banking operations. During years of high groundwater recharge efforts, the groundwater table could potentially be shallow enough to present a liquefaction hazard, although there has been no evidence of previous liquefaction. The depths to groundwater between 2000 and 2011 at wells within the Phase I area ranged from about 35 to 330 feet, with depths larger than 50 feet since mid-2007 (TH&C 2015).

Seismically Induced Landslide

A landslide is a mass of rock, soil, and debris displaced down-slope by sliding, flowing, or falling. The susceptibility of land (slope) failure is dependent on the slope and geology as well as the amount of rainfall, excavation, or seismic activities. Factors that decrease resistance to movement in a slope include pore water pressure, material changes, and structure. Removing the lower portion (the toe) of a slope decreases or eliminates the support that opposes lateral motion in a slope. Shaking during an earthquake may lead materials in a slope to lose cohesion and collapse. Due to the relatively flat topography in the vicinity of the project area, there is between a one and ten percent chance of occurrence (KCFD 2012).

Geologic Hazards

Erosion

Erosion is the wearing away of soil and rock by processes such as mechanical or chemical weathering, mass wasting, and the action of water and wind. Excessive soil erosion can eventually damage infrastructure such as pipelines, wellheads, building foundations, and roadways. In general, granular soils with relatively low cohesion and soils located on steep topography have a higher potential for erosion. In general, the project area is flat and is not susceptible to erosion by water. In addition and as previously discussed, due to the high permeability of these soils, there is very low surface runoff potential and, therefore, low susceptibility to erosion by water (Kleinfelder 2010). However, each of these soil types is moderately susceptible to wind erosion when groundcover is not present.

Expansive Soils

Expansive soils possess a shrink-swell characteristic[6] that can result in structural damage over a long period of time. Expansive soils are largely comprised of silicate clays, which expand in volume when water is absorbed and shrink when dried. Highly expansive soils can cause damage to foundations and roads. As previously discussed, the clay content of onsite soils may be moderately susceptible to shrinkage or swelling (Kleinfelder 2010).

Land Subsidence

Several processes contribute to land subsidence in the regional area and include, in order of decreasing magnitude: aquifer compaction by overdraft, hydrocompaction (discussed in the next section), petroleum reservoir compaction due to oil and gas withdrawal, and subsidence caused by tectonic forces (GEI 2019). Inelastic compaction or land subsidence occurs in the fine-grained beds of the aquifer system. Clays and silts, although not very permeable, are typically highly porous. In many of these fine-grained layers, pore spaces are supported by water at the time of deposition. This water is essentially groundwater storage, although the majority of it is a component of inelastic storage, therefore it is not reusable. During over-pumping conditions (also called overdraft), groundwater is pumped from pore spaces between grains of sand and gravel. Once the aquifer system is pumped beyond the sustainable yield, the lowered water pressure in the sand and gravel causes slow drainage of water from the clay and silt beds. The subsequent release of water and water pressure from the clay and silt beds result in compaction (the beds become thinner) as clay particles supported by water in pore spaces rearrange and collapse. Groundwater cannot re-enter the clay structure after the collapse. This condition represents a permanent loss of the water storage volume in the clay layers. The effects of compaction are also seen as a lowering of the land surface, otherwise known as land subsidence.

Within the Kern County Sub-basin where the project area is located (see Section 3.10, *Hydrology and Water Quality*, for discussion of the sub-basin), subsidence has been documented at up to 12 feet from 1926 to 1970 (GEI 2019). About 75 percent of the subsidence occurred in the 1950s and 1960s, corresponding to extensive groundwater development. Water levels during this period were continuing to fall to historic lows each year and were associated with larger amounts of subsidence.

Rosedale conducts subsidence monitoring in the project area (Rosedale 2019). Subsidence has occurred historically north and south of Rosedale, but not within its boundaries. Subsidence has been continuously monitored by DWR since June 1994 with an extensometer located about two miles south of the Phase 1 area within the Kern Water Bank Authority water district (see Section 3.10, *Hydrology and Water Quality*, Figure 3.10-1 for district location and Figure 3.10-2 for extensometer location). The results of the monitoring indicate both upward and downward changes of at most 0.1 foot per year have occurred within an overall upward trend of inflation. As of June 2018, the land surface was 0.27 feet higher than the land surface in June 1994. The data indicates subsidence has not resulted from KWB recovery operations during extended droughts.

6 "Shrink-swell" is the cyclical expansion and contraction that occurs in fine-grained clay sediments from wetting and drying. Structures located on soils with this characteristic may be damaged over a long period of time, usually as the result of inadequate foundation engineering.

DWR has developed, as part of their SGMA technical assistance a Statewide InSAR subsidence dataset. InSAR is a satellite-based remote sensing technique that measures vertical surface displacement changes at high degrees of measurement resolution and spatial detail. Subsidence for 2016 and 2017 in and near Rosedale was upward by about 0.01 foot per year. This increase denotes swelling rather than subsidence in the project area.

Hydrocompaction

Hydrocompaction is a form of land subsidence that occurs when unsaturated soils, low density fine grained soils with small pores and voids, are subjected to increased moisture content. The moisture alters the cementation structure of the normally arid soils. The rearrangement of the soil structure causes collapse and differential settlement to occur under relatively light loading. To avoid adverse effects to physical structures due to hydrocompaction, contractors typically implement processes to ensures soils are hydrocompacted prior to construction. For example, soils in many areas crossed by the California Aqueduct were intentionally hydrocompacted before aqueduct construction to avoid subsidence problems. As a result, subsidence due to hydrocompaction in these areas has been minimal.[7] Areas of the project area not previously reworked or developed as recharge basins could be susceptible to hydrocompaction.

Paleontological Resources

The Society of Vertebrate Paleontology (SVP) has established standard guidelines (SVP 2010) that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Although not regulations per se, most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines.

Paleontological resources are the fossilized remains or impressions of plants and animals, including vertebrates (animals with backbones; mammals, birds, fish, etc.), invertebrates (animals without backbones; starfish, clams, coral, etc.), and microscopic plants and animals (microfossils). They are valuable, nonrenewable, scientific resources used to document the existence of extinct life forms and to reconstruct the environments in which they lived. Fossils can be used to determine the relative ages of the depositional layers in which they occur and of the geologic events that created those deposits. The age, abundance, and distribution of fossils depend on the geologic formation in which they occur and the topography of the area in which they are exposed. The geologic environments within which the plants or animals became fossilized usually were quite different from the present environments in which the geologic formations now exist. According to SVP guidelines, 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).

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing

[7] *Ibid*.

significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. The SVP guidelines define four categories of paleontological sensitivity (potential) for rock units: high, low, undetermined, and no potential.

Criteria for assessing significance of paleontological resources have been developed by numerous researchers (e.g., Eisentraut and Cooper, 2002; Murphey and Daitch, 2007; Scott and Springer, 2003). Significant paleontological resources are fossils or assemblages of fossils that are unique, unusual, rare, uncommon, stratigraphically important, and/or those that add to an existing body of knowledge in specific areas – stratigraphically, taxonomically, and/or regionally (Eisentraut and Cooper 2002; Murphey and Daitch 2007; Scott and Springer 2003). Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology, are also critically important (Scott and Springer, 2003; Scott et al., 2004).

Paleontological Resources Records Searches

A paleontological resource records search for records of vertebrate fossil localities within the project area was conducted by the Natural History Museum of Los Angeles County (LACM localities) (LACM 2020). The purpose of the records search was to: (1) determine whether any previously recorded fossil localities occur in the area; (2) assess the potential for disturbance of these localities during construction; and (3) assist in evaluating the paleontological sensitivity of the project area.

The results of the record search indicate that no known vertebrate fossil localities have been recorded within the proposed project area. However, there are known vertebrate fossil localities situated nearby from the same sedimentary deposits that occur subsurface in the proposed project area, although at some distance. The records search states that surface deposits in the proposed project are made up of younger Quaternary Alluvium, resulting mainly as fluvial deposits associated with the Kern River, which flows to the south of the proposed project, and the Goose Lake Channel tributary that flows through the Phase 1 area. These Quaternary units do not contain vertebrate fossils in the uppermost layers. However, the records search specifies that older Quaternary Alluvium deposits at depth within the proposed project area could yield fossil vertebrate remains.

The closest vertebrate fossil locality from older Quaternary Alluvium deposits is LACM 1156 located approximately 30 miles north of the Phase 1 area, which yielded a fossil specimen of horse at a depth of 45 feet below surface. The next closest fossil locality is LACM (CIT) 117, located approximately 40 miles north of the Phase 2 area and Kern Fan Conveyance Facilities area, which produced a fossil specimen of horse from a well core at a depth of 425 feet. Additional vertebrate fossil localities from older Quaternary Alluvium deposits (otherwise mapped as the Kern River Formation) include LACM 6701, located approximately 37 miles northeast of the Phase 1 area, and LACM 4087, located approximately 42 miles northeast of the Phase 1 area, which yielded specimens of fossil mammoth at unspecified depths.

An additional review of the collections of the University of California Museum of Paleontology (UCMP) yielded over 30,000 fossils from the Pleistocene of Kern County (UCMP 2020). Nearly all of these fossils are from a series of tar seeps, about 15 miles west of the project area. Approximately 30 miles east of the project area, several dozen vertebrate fossils were collected from alluvium similar to that underlying the project area, including pocket gopher, Kangaroo rat, pack rat, and a frog.

Paleontological Sensitivity Analysis

The review of the geologic mapping and results from the LACM and UCMP were used to assign paleontological sensitivity to the geologic units present in and in very close proximity to the project area, following the guidelines of the SVP (2010), and are as follows:

- Alluvial Valley and Fan Deposits – Late Holocene deposits are considered to have low potential for fossil resources since it is too young to have preserved fossilized remains. However, young alluvium often overlies older alluvium at depth so the fossil potential increases with depth. It is difficult to predict the depth to the early Holocene and geologists often rely on geotechnical reports or natural or constructed cuts.
- Young Lacustrine, Playa, Estuarine, and Young Alluvial Fan Deposits – The young lacustrine, playa, and estuarine deposits and younger Quaternary alluvial deposits from the Late Pleistocene to Holocene (which date back to approximately 129,000 to 11,700 years ago) have a high paleontological sensitivity for yielding fossils due to their age as well as environments. Lacustrine and playa deposits, in particular, are known for extensive fossil deposits worldwide. As previously mentioned above, several fossils from older Quaternary alluvium deposits have been found in the Kern County (between 30 and 40 miles away from the project areas.
- Tulare Formation – This unit has a high potential for preserving significant fossils based on the known record as well as mix of marine and non-marine, fine-grained sediments and Pleistocene tar seeps. While the chances are low for finding additional Pleistocene tar seeps in the project area, finding tar would also constitute a significant discovery.

3.7.2 Regulatory Setting

Federal

Clean Water Act

The federal Clean Water Act (CWA) and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (USEPA), was enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The purpose of the CWA is to protect and maintain the quality and integrity of the nation's waters by requiring states to develop and implement State water plans and policies. The CWA gave the USEPA the authority to implement pollution control programs such as setting wastewater standards for industry. In California, implementation and enforcement of the National Pollutant Discharge Elimination System (NPDES) program is conducted through the California State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs).

National Pollutant Discharge Elimination System (NPDES) Permit

The NPDES permit system was established in the CWA to regulate municipal and industrial point discharges to surface waters of the U.S. Each NPDES permit for point discharges contains limits on allowable concentrations of pollutants contained in discharges. Section 402 of the CWA contain general requirements regarding NPDES permits. The CWA was amended in 1987 to require NPDES permits for non-point source (i.e., stormwater) pollutants in discharges. Stormwater sources are diffuse and originate over a wide area rather than from a definable point. The goal of NPDES stormwater regulations is to improve the quality of stormwater discharged to receiving waters to the "maximum extent practicable" through the use of structural and non-structural Best Management Practices (BMPs). BMPs can include the development and implementation of various practices including educational measures (workshops informing public of what impacts results when household chemicals are dumped into storm drains), regulatory measures (local authority of drainage facility design), public policy measures, and structural measures (filter strips, grass swales and detention ponds). As noted above in the CWA, the USEPA has delegated the authority for regulating NPDS permits to the state level in California. The NPDES permits that apply to activities in Kern County are described under State and local regulations below.

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to protect structures for human occupancy from the hazard of surface faulting. In accordance with the act, the State Geologist has established regulatory zones—called earthquake fault zones—around the surface traces of active faults, and has published maps showing these zones. Buildings for human occupancy cannot be constructed across surface traces of faults that are determined to be active. Because many active faults are complex and consist of more than one branch that may experience ground surface rupture, earthquake fault zones extend approximately 200 to 500 feet on either side of the mapped fault trace. This act does not apply to the project because no active faults cross the project area.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was passed in 1990 following the Loma Prieta earthquake to reduce threats to public health and safety and to minimize property damage caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones, and cities, counties, and other local permitting agencies to regulate certain development projects within these zones. For projects that would locate structures for human occupancy within designated Zones of Required Investigation, the Seismic Hazards Mapping Act requires project applicants to perform a site-specific geotechnical investigation to identify the potential site-specific seismic hazards and corrective measures, as appropriate, prior to receiving building permits. The *CGS Guidelines for Evaluating and Mitigating Seismic Hazards* (Special Publication 117A) provides guidance for evaluating and mitigating seismic hazards (CGS 2008). The CGS is in the process of producing official maps based on USGS topographic quadrangles. To date, the CGS has not completed a delineation for the USGS quadrangle in which project components are proposed.

NPDES Construction General Permit

Construction associated with the proposed project would disturb more than one acre of land surface. The proposed project would, therefore, be subject to the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). The Construction General Permit regulates discharges of pollutants in stormwater associated with construction activity. from construction sites that disturb one acre or more of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface. The permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground projects, including installation of water pipelines and other utility lines.

The Construction General Permit requires that construction sites be assigned a Risk Level of 1 (low), 2 (medium), or 3 (high), based both on the sediment transport risk at the site and the receiving waters risk during periods of soil exposure (e.g., grading and site stabilization). The sediment risk level reflects the relative amount of sediment that could potentially be discharged to receiving water bodies and is based on the nature of the construction activities and the location of the site relative to receiving water bodies. The receiving waters risk level reflects the risk to the receiving waters from the sediment discharge. Depending on the risk level, the construction projects could be subject to the following requirements:

- Effluent standards;
- Good site management "housekeeping;"
- Non-stormwater management;
- Erosion and sediment controls;
- Run-on and runoff controls;
- Inspection, maintenance, and repair; or
- Monitoring and reporting requirements.

The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific best management practices (BMPs) designed to prevent sediment and pollutants from contacting stormwater from moving offsite into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

The SWPPP must be prepared before the construction begins. The SWPPP must contain a site map(s) that delineates the construction work area, existing and proposed buildings, parcel boundaries, roadways, stormwater collection and discharge points, general topography both

before and after construction, and drainage patterns across the project area. The SWPPP must list BMPs and the placement of those BMPs that the applicant would use to protect stormwater runoff. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Examples of typical construction BMPs include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing and fueling. The Construction General Permit also sets post-construction standards (i.e., implementation of BMPs to reduce pollutants in stormwater discharges from the site following construction).

In the project area, the Construction General Permit is implemented and enforced by the Central Valley Regional Water Quality Control Board, which administers the stormwater permitting program. Dischargers must electronically submit a notice of intent and permit registration documents to obtain coverage under this Construction General Permit. Dischargers are to notify the Central Valley Regional Water Quality Control Board of violations or incidents of non-compliance, and submit annual reports identifying deficiencies in the BMPs and explaining how the deficiencies were corrected. The risk assessment and SWPPP must be prepared by a State Qualified SWPPP Developer, and implementation of the SWPPP must be overseen by a State Qualified SWPPP Practitioner. A legally responsible person, who is legally authorized to sign and certify permit registration documents, is responsible for obtaining coverage under the permit.

Public Resources Code Sections 5097.5 and 30244

California Public Resources Code Sections 5097.5 and 30244 specify State requirements for paleontological resource management. These statutes prohibit the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency, defining their removal as a misdemeanor. Sections 5097.5 and 30244 require reasonable mitigation of adverse impacts on paleontological resources from developments on public (State, county, city, district) lands.

Local

Kern County Code

The Kern County Code of Ordinances would require issuance of a well drilling permit prior to construction of proposed project wells (*Kern County Code*, Title 14, Chapter 14.08). Other permits, such as grading, construction, and building permits would not be required because the proposed water facilities are considered exempt under *Government Code* Section 53091.

Kern County General Plan

The project area is located within the area governed by the *Kern County General Plan* (County General Plan) (Kern County Planning Department 2009). Within the Land Use, Conservation, and Open Space and Safety Elements of the County General Plan, there is a goal, policies, and

implementation measures that are applicable to the proposed project regarding geology and soils and paleontological resources:

Safety Element, Induced Surface Rupture, Ground Shaking, and Ground Failure Section

Implementation Measure B: Require geological and soils engineering investigations in identified significant geologic hazard areas in accordance with the Kern County Code of Building Regulations.

Implementation Measure C: The fault zones designated in the Kern County Seismic Hazard Atlas should be considered significant geologic hazard areas. Proper precautions should be instituted to reduce seismic hazard, whenever possible in accordance with State and County regulations.

Implementation Measure H: Require that plans and permits for installation of major lifeline components such as highways, utilities, petroleum or chemical pipelines to incorporate design features to accommodate potential fault movement in areas of active faults without prolonged disruption of essential service or threat to health and safety.

Safety Element, Landslide, Subsidence, Seiche, and Liquefaction Section

Policy 1: Determine the liquefaction potential at sites in areas of shallow groundwater (Map Code 2.3) prior to discretionary development and determine specific mitigation to be incorporated into the foundation design, as necessary, to prevent or reduce damage from liquefaction in an earthquake.

Policy 2: Route major lifeline installations around potential areas of liquefaction or otherwise protect them against significant damage from liquefaction in an earthquake.

Implementation Measure D: Discretionary actions will be required to address and mitigate impacts from inundation, land subsidence, landslides, high groundwater areas, liquefaction and seismic events through the CEQA process.

Archaeological, Paleontological, Cultural, and Historical Preservation

Policy 25: The County will promote the preservation of cultural and historic resources which provide ties with the past and constitute a heritage value to residents and visitors.

Implementation Measure M: In areas of known paleontological resources, the County should address the preservation of these resources where feasible.

Bakersfield General Plan

The project area is also located within the area governed by the *Metropolitan Bakersfield General Plan* (Bakersfield General Plan) (City of Bakersfield and Kern County 2002). Within the Safety Element of the Bakersfield General Plan, there are goals, policies, and implementation measures that are applicable to the proposed project regarding geology and soils:

Goal 1: Substantially reduce the level of death, injury, property damage, economic and social dislocation and disruption of vital services that would result from earthquake damage.

Goal 5: Protect essential lifelines and prevent casualties and major social and economic disruption due to liquefaction in an earthquake.

Policy 1: Ensure that earthquake survival and efficient post-disaster functions are a primary objective in the siting, design, and construction standards for discretionary essential facilities or the expansion of such facilities.

Policy 13: Determine the liquefaction potential at sites in areas of high groundwater prior to the development and determine specific mitigation to be incorporated into the foundation design, as necessary to prevent or reduce damage from liquefaction in an earthquake.

Policy 14: Route major lifeline installations around potential liquefaction areas or otherwise protect them against significant damage from liquefaction in an earthquake.

Implementation Measure 2: Require detailed studies for ground shaking characteristics, liquefaction potential, dam failure inundation and flooding potential, and fault rupture potential, as background to the design process for critical facilities under the city and county discretionary approval.

Implementation Measure 3: Require structures that are within the plan area and are subject to Building Department review to adhere to the most current seismic standards adopted as part of the Uniform Building Code.

Within the Land Use Element of the Bakersfield General Plan, there are goals, policies, and implementation measures that are applicable to the proposed project regarding paleontological resources:

Policy 104: As part of the environmental review procedure, an evaluation of the significance of paleontological, archaeological, and historical resources and the impact of proposed development on those resources shall be conducted and appropriate mitigation and monitoring included for development projects.

3.7.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to geology, soils, and paleontological resources. The proposed project would have a significant impact if it would:

1. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
    a. 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.
    b. Strong seismic ground shaking.
    c. Seismic-related ground failure, including liquefaction.
    d. Landslides.
2. Result in substantial soil erosion or the loss of topsoil.

3. 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.
4. Be located on expansive[8] soil creating direct or indirect substantial risks to life or property;
5. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.
6. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
7. Result in cumulatively considerable impacts to geology, soils, and paleontological resources.

Methodology

This environmental analysis of the potential impacts related to geology and soils is based on a review of the results of the site-specific investigations and modeling, a review of literature and database research (geologic, seismic, and soils reports and maps), and the Kern County General Plan. The environmental analysis of the potential impacts related to paleontological resources is based on a desktop analysis of published geological maps, a literature search for fossil resources, and a search of online museum databases. A records search from the LACM was requested for known fossil localities in the project area.

The proposed project would be regulated by the various laws, regulations, and policies summarized above in Section 3.7.2, *Regulatory Setting*. Compliance by the proposed project with applicable federal, State, and local laws and regulations is assumed in this analysis and local and State agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations is a condition of permit approval.

After considering the implementation of the proposed project described in Chapter 2, *Project Description*, and compliance with the required regulatory requirements, the environmental analysis below identifies if the defined significance thresholds are exceeded and, therefore, a significant impact would occur. For those impacts considered to be significant, mitigation measures are proposed to the extent feasible to reduce the identified impacts.

A significant impact would occur if, after considering the features described in Chapter 2, *Project Description* of this Draft EIR, and the required compliance with regulatory requirements, a significant impact would still occur. For those impacts considered to be significant, mitigation measures are proposed to reduce the identified impacts.

[8] The CBC, based on the International Building Code and the now defunct Uniform Building Code, no longer includes a Table 18-1-B. Instead, Section 1803.5.3 of the CBC describes the criteria for analyzing expansive soils.

Impact Analysis

Seismic Hazard

Impact 3.7-1: The proposed project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, and landslides. (*Less than Significant Impact*)

Construction

Construction activities would be temporary and would not involve construction of enclosed habitable structures, and thus, are not anticipated to exacerbate the exposure of people or structures to substantial adverse effects involving seismic hazards. In addition, construction of the proposed project would not exacerbate the potential for earthquakes because the placement of water in the recharge basins would not occur until after construction is complete.

Operation

The faults most susceptible to earthquake rupture are active faults, which are faults that have experienced surface displacement within the last 11,700 years. There are no active faults that cross the project area, and the nearest active fault is more than 15 miles away. Therefore, the potential for fault rupture to affect the proposed project is very low. Furthermore, the proposed project is located within an area that is relatively flat with very little topographic relief. Therefore, there is no potential for landslides or lateral spreading. No impact would occur regarding fault rupture or landsides and lateral spreading.

The placement of recharge basins on an active fault could result in water entering the fault zone, which could activate movement along the fault and cause an earthquake. However, as discussed in Section 3.7.1, *Environmental Setting, Regional Faults*, the project area is not located on or within at least 15 miles of an active fault. Therefore, the project could not exacerbate the potential for earthquakes.

The project vicinity has experienced and would likely continue to experience strong seismic ground shaking due to its proximity to a number of active faults, including the San Andreas Fault and the Garlock fault. In the event that ground shaking caused damage to a recharge basin and/or conveyance structure, released water would likely infiltrate into the permeable soils that comprise the project area. The recharge basins would be constructed below grade with berms constructed above grade, which, coupled with the relatively flat topography, would hinder movement of water offsite. In addition, the project area and its surroundings is characterized primarily by agricultural land use with few, if any, structures. Therefore, the potential risk of loss, injury, or death from strong seismic shaking is considered low, and impacts would be less than significant.

In addition, if strong seismic ground shaking were to occur during a time of a relatively shallow depth to groundwater or otherwise saturated soil conditions from recharge activities, the project area soils could be susceptible to seismically-induced liquefaction hazards. At the proposed recharge basins, shallow depth to groundwater could cause liquefaction during a seismic event if groundwater levels were allowed to rise up to and remain within 50 feet of the ground surface beneath the basins. As explained in Section 3.10, *Hydrology and Water Quality*, with operation of

the proposed project, shallow depth to groundwater is not expected to rise up to within 50 feet of the ground surface as demonstrated by the results of the groundwater modeling conducted for representative recharge basin locations in and around the Phase 1 and Phase 2 areas. As discussed under Impact 3.10-2 in Section 3.10, *Hydrology and Water Quality*, during periods of high groundwater levels, such as during 2012, recharge of up to approximately 117,000 AF would result in groundwater levels rising up to approximately 64 feet below the ground surface directly beneath the recharge basins; and depth to groundwater would increase with distance from the recharge basins offsite (see Figure 3.10-6). Therefore, the proposed project would not result in shallow groundwater within 50 feet of the ground surface and thus would not cause liquefaction during a seismic event. There would be no potential for risk of loss, injury or death from liquefaction, and impacts would be less than significant.

Mitigation Measures

None Required

Significance Conclusion

Less than Significant Impact

Soil Erosion

Impact 3.7-2: The proposed project would not result in soil erosion or the loss of topsoil. (*Less than Significant Impact*)

Construction

Construction activities at the project area would require excavation for the construction of the recharge basins, conveyance canals and pipelines; drilling activities for the construction of recovery wells, and the construction of a turnout at the California Aqueduct. Construction activities would include site clearing; excavation and backfill; and construction of basins, conveyance channels, pipelines, pump stations, and the turnout. Grading activities associated with the construction of the recharge basins would involve earthmoving, excavation, stockpiling, and grading; all of which could expose soils to erosion processes. The canals and/or pipelines would be constructed using typical open trench construction methods, with the exception of crossing Interstate-5 and other locations where siphons would be installed (see Section 2.4.4), where jack and bore methods would be used to tunnel under and avoid disruption of surface features. Excavation of soils up to 12 to 22 feet deep would be required; and excavated soils would be redistributed and utilized to cover the embedded pipeline, and to create berms around the recharge basins, to the extent feasible. The extent of erosion that would occur would vary depending on slope steepness/stability, vegetation/cover, concentration of runoff, and weather conditions.

To prevent water and wind erosion during the construction period, a Storm Water Pollution Prevention Plan (SWPPP) would be developed and implemented for the proposed project as required for all projects that disturb more than one acre, as described in Section 3.7.2, *Regulatory Setting, NPDES Construction General Permit*. The Construction General Permit requires the

preparation and implementation of a SWPPP that would specify BMPs to prevent construction pollutants, including eroded soils (such as topsoil), from moving off-site and provide erosion control measures to protect the topsoil. The recharge basins and supply canals would be designed in an effort to balance earthwork on site in which all excavated soils would be redistributed and utilized to construct the project facilities. Topsoil materials would be stripped from the ground surface and used for construction of the earthen berms of the recharge ponds. The SWPPP also requires stockpiled soils to be watered and/or covered to prevent loss due to wind erosion. As a result of these efforts, loss of topsoil and substantial soil erosion during the construction period are not anticipated.

Operation

During operation of the groundwater recharge basins, the recharge basins would contain water, which would inhibit erosion; during periods of non-recharge, the recharge basins would be subject to wind erosion. Agricultural land uses, such as annual farming, grazing, or fallowing, would be allowed within the basins when the basins are not needed for water recharge or water management purposes. Plant cover in the basins would minimize wind erosion. Operation of the recovery wells, canals, pump stations, and pipelines would not contribute to wind erosion since these structures would not have exposed soil.

To minimize soil erosion and loss of topsoil during construction, the project would be required to develop and implement a SWPPP, which would provide water and wind erosion control measures to protect the topsoil. During project operation, the groundwater recharge basins would contain water, which would inhibit erosion, and plant cover would minimize wind erosion during non-recharge periods. With implementation of the SWPPP and the operational design of the proposed project, impacts related to soil erosion and topsoil loss would be less than significant.

Mitigation Measures

None Required

Significance Conclusion

Less than Significant Impact

Unstable Soils and Subsidence

Impact 3.7-3: The proposed project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and would not result in on- or off-site subsidence or collapse. (*Less than Significant Impact*)

Construction

Construction activities would not include the extraction or recharge of water, and thus, would not result in any changes to soil or a geologic unit that would cause subsidence or collapse.

Operation

Rosedale conducts subsidence monitoring in the project area (Rosedale 2019). Subsidence has occurred historically north and south of Rosedale but not within its boundaries. Subsidence has

been continuously monitored by DWR since June 1994 with an extensometer located about two miles south of the Phase 1 area within the Kern Water Bank Authority (see Figure 3.10-1 for district location and Figure 3.10-2 for extensometer location). The results of the monitoring indicate that both upward and downward changes of at most 0.1 foot per year have occurred within an overall upward trend of inflation. As of June 2018, the land surface was 0.27 feet higher than the land surface in June 1994. The data indicates subsidence has not resulted from KWB recovery operations during extended droughts. DWR has developed, as part of their SGMA technical assistance a statewide InSAR subsidence dataset. InSAR is a satellite-based remote sensing technique that measures vertical surface displacement changes at high degrees of measurement resolution and spatial detail. Subsidence for 2016 and 2017 in the Rosedale area was upward by about 0.01 foot per year. This increase denotes swelling rather than subsidence in the project area.

The proposed project is a groundwater banking project that would require water to be recharged prior to extraction. Groundwater banking programs generally benefit water levels in the local aquifer because the amount of water available for recovery is less than the amount recharged; this difference can raise groundwater levels. The proposed project would serve to correct declining groundwater levels, one of the primary causes of compaction and subsidence, and therefore would serve to mitigate against additional subsidence to some degree. The proposed project would provide additional recharge capacity in excess of recovery and as such would not cause subsidence relative to existing conditions. Impacts would be less than significant, and no mitigation is required.

Mitigation Measures

None Required

Significance Conclusion

Less than Significant Impact

Expansive Soils

Impact 3.7-4: The proposed project could be located on expansive soils but would not create direct or indirect substantial risks to life or property. (*Less than Significant Impact*)

Construction

Construction activities would not include the placement of water in the recharge basins, and thus, would not cause expansion of soils.

Operation

The proposed project would include the placement of water in recharge basins that would infiltrate down into the underlying aquifer. The soils within the basins would undergo alternating wetting and drying cycles. As discussed in Section 3.7.1, *Environmental Setting, Expansive Soils*, the clay content of onsite soils may be moderately susceptible to shrinkage or swelling. The wetting of soil within the basins may cause expansion but there would be no structures within the

basins that could be damaged. The berms that form the basin sides may experience some effects of the alternating wetting and drying cycles. However, as discussed in Section 2.7, *Maintenance*, it is anticipated that the basins would require periodic earthwork to maintain the berms, and such maintenance would be included in the routine operations of the project.

The interior of the recharge basins would not have structures that could be damaged by the expansion of soil during operation of the basins for recharge. Maintenance of the proposed project would include periodic earthwork to maintain the berms that form the recharge basins. Therefore, the proposed project would not result in damage to structures due to expansive soils, and there would be no direct or indirect risk to life or property. Impacts would be less than significant, and no mitigation is required.

Mitigation Measures

None Required

Significance Conclusion

Less than Significant Impact

Septic Tanks

Impact 3.7-5: The proposed project would not have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water. (*No Impact*)

The proposed project does not involve the construction or use of septic tanks or alternative wastewater disposal systems. Therefore, there would be no impact.

Mitigation Measures

None Required

Significance Conclusion

No Impact

Paleontological Resources and Unique Geologic Features

Impact 3.7-6: The proposed project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. (*Less than Significant Impact with Mitigation*)

Construction

Construction activities at the project area would require excavation for the construction of the recharge basins, conveyance canals and pipelines; drilling activities for the construction of recovery wells (with completion intervals between approximately 200 and 900 feet below ground surface), and the construction of a turnout at the California Aqueduct. Construction activities

would include site clearing; excavation and backfill; and construction of basins, conveyance canals, pipelines, pump stations, and the turnout. Grading activities associated with the construction of the recharge basins would involve earthmoving, excavation, and grading. The canals and pipelines would be constructed using typical open trench construction methods, with the exception of crossing Interstate-5 and other locations where siphons would be installed, where jack and bore methods would be used to tunnel under and avoid disruption of surface features. Excavation up to 22 feet would be required; and excavated soils would be redistributed and utilized to cover the embedded pipeline, and to create berms around the recharge basins, to the extent feasible. All of these construction activities have the potential to expose paleontological resources or unique geologic features.

The analysis of paleontological resources for the proposed project indicates that Late Holocene alluvial deposits are found within surficial deposits in the Phase 1 area. These deposits have a low paleontological sensitivity, though sensitivity increases with depth due to the age. Based on standard geological principles and similar encounters elsewhere in Kern County, there is a potential to encounter fossils at depth. Estimating the depth is difficult, but it is likely to be over 20 feet below the present surface. Any excavation below 20 feet may encounter paleontological resources, unless the depth to older facies is encountered at a shallower or deeper depth.

The Phase 2 area is underlain predominantly by young lake, playa, and estuarine deposits. As these deposits are inferred to extend at depth to the Pleistocene and are composed of fine-grained sediments, there is a high potential for recovering unique paleontological resources below the agriculturally modified soils.

The Kern Fan Conveyance Facilities Area spans all of these alluvial units, and excavations in this area could encounter unique paleontological resources at various depths.

It should also be noted that the Tulare Formation underlies the project area. Excavations that penetrate below the alluvium into the underlying Tulare Formation, which has a high potential for preserving significant fossils based on the known record as well as mix of marine and non-marine, fine-grained sediments and Pleistocene tar seeps, may encounter unique paleontological resources.

Operation

Once constructed, the operations phase of the project would have no potential to encounter paleontological resources.

Since the proposed project includes ground disturbance up to 900 feet in depth for drilling and 22 feet for excavation, the proposed project could impact unique paleontological resources. **Mitigation Measures PALEO-1** and **PALEO-2**, which include retention of a Qualified Paleontologist, development of a paleontological resources mitigation and monitoring plan, construction worker training, monitoring, procedures to follow in the event of discovery of paleontological resources, and preparation of a paleontological monitoring report, would reduce potentially significant impacts to paleontological resources to a less than significant level.

Mitigation Measures

PALEO-1: Paleontological Assessment and Mitigation Plan. Prior to the start of any ground-disturbing activities (e.g., demolition, pot-holing or auguring, boring, drilling, grubbing, construction-related vegetation removal, excavation, trenching, or any other activity that has potential to disturb soil), the Authority shall retain a Qualified Paleontologist who meets the professional criteria established by the Society of Vertebrate Paleontology (SVP) to implement the paleontological resources mitigation measures for the proposed project. Once the locations of the project components have been determined and prior to the initiation of ground disturbance, a paleontological literature, map, and museum locality review shall be conducted in order to assess the paleontological sensitivity of the project component. If the literature, map, and museum locality review identifies potentially sensitive paleontological resources, then the Qualified Paleontologist shall conduct a pedestrian survey and assessment of the project component. A report shall be prepared which summarizes the results of the survey and assessment and provides recommendations regarding implementation of mitigation, as needed. Mitigation may include preparation of a Paleontological Resources Mitigation Monitoring Plan (PRMMP), implementation of the PRMMP including construction monitoring if required, paleontological resources awareness training for construction personnel, and preparation of a paleontological monitoring report when construction is complete demonstrating compliance with the PRMMP.

PALEO-2: Inadvertent Discoveries of Paleontological Resources. In the event that paleontological resources are discovered, the Authority will notify the Qualified Paleontologist. The paleontologist will document the discovery as needed, evaluate the potential resource, and assess the significance of the find under the criteria set forth in *CEQA Guidelines* Section 15064.5. If fossil or fossil bearing deposits are discovered during construction, excavations within 50 feet of the find will be temporarily halted or diverted until the discovery is examined by the Qualified Paleontologist. The paleontologist will notify the appropriate agencies to determine procedures that shall be followed before construction is allowed to resume at the location of the find. If the Authority determines that avoidance is not feasible, the paleontologist will prepare an excavation plan for mitigating the effect of the project on the qualities that make the resource important. The plan will be submitted to the Authority for review and approval prior to implementation.

Significance Conclusion

Less than Significant Impact with Mitigation

Cumulative Impacts

Impact 3.7-1: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to geology and paleontological resources. (*Less than Significant Impact with Mitigation*)

This section presents an analysis of the cumulative effects of the proposed project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts.

As previously discussed, the proposed project would have no impact with respect to fault rupture, landslides, lateral spreading, septic tanks and alternate wastewater disposal systems. Accordingly, the proposed project could not contribute to cumulative impacts related to these topics and are not discussed further.

The geographic area affected by the proposed project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative geologic impacts encompasses and is limited to the project area and its immediately adjacent area. This is because impacts relative to geologic hazards and paleontological resources are generally site-specific. For example, the effect of erosion would tend to be limited to the localized area of a project and could only be cumulative if erosion occurred as the result of two or more adjacent projects that spatially overlapped.

The timeframe during which proposed project could contribute to cumulative geologic hazards includes the construction and operations phases. For the proposed project, the operations phase is permanent. However, similar to the geographic limitations discussed above, it should be noted that impacts relative to geologic hazards are generally time-specific. Geologic hazards could only be cumulative if two or more geologic hazards occurred at the same time, as well as overlapping at the same location.

Construction

Significant cumulative impacts related to geologic hazards could occur if the incremental impacts of the proposed project combined with the incremental impacts of one or more of the cumulative projects identified in Table 3-2 to substantially increase risk that people or the environment would be exposed to geologic hazards. The only cumulative project that could be geographically adjacent or overlap components of the proposed project would be the groundwater banking and recovery Project Numbers 3 through 10, 12, and 13 being implemented by Rosedale, Kern Fan Authority, City of Bakersfield, Buena Vista Water Storage District, and the Kern Water Bank Authority, as located on Figure 3-1. All of these cumulative projects are similar to the proposed Kern Fan Groundwater Storage Project and include recharge basins, recovery wells, pipelines and/or canals, and associated infrastructure.

If the projects are constructed at the same time, the erosion effects could be cumulatively significant. However, the state Construction General Permit would require each project to prepare and implement a SWPPP. The SWPPPs would describe BMPs to control runoff and prevent erosion for each project. Through compliance with this requirement, the potential for erosion impacts would be reduced. The Construction General Permit has been developed to address cumulative conditions arising from construction throughout the state, and is intended to maintain cumulative effects of projects subject to this requirement below levels that would be considered significant. For example, two adjacent construction sites would be required to implement BMPs to reduce and control the release of sediment and/or other pollutants in any runoff leaving their respective sites. The runoff water from both sites would be required to achieve the same action levels, measured as a maximum amount of sediment or pollutant allowed per unit volume of runoff water. Thus, even if the runoff waters were to combine after leaving the sites, the sediments and/or pollutants in the combined runoff would still be at concentrations (amount of

sediment or pollutants per volume of runoff water) below action levels and would not be cumulatively considerable (less than significant).

As discussed in Impact 3.7-5, *Paleontological Resources*, the proposed project has the potential to encounter significant paleontological resources. To reduce the potential impact to less than significant, the proposed project would implement mitigation measures PALEO-1 and PALEO-2. Given the nearby locations of Cumulative Projects 3 through 10, 12, and 13 the cumulative projects would also have the potential to encounter significant paleontological resources. To reduce the potential impact to less than significant, the cumulative projects that include substantial depths of excavation would also be required to implement mitigation measures similar to Mitigation Measures PALEO-1 and PALEO-2. With implementation of these mitigations measures, the potential impacts to paleontological resources would be reduced to not cumulatively considerable and less than significant.

Operations

Seismically-induced groundshaking, liquefaction and lateral spreading, and expansive soils could cause structural damage or pipeline leaks or ruptures. State and local building regulations and standards, described in Section 3.7.2, *Regulatory Setting*, have been established to address and reduce the potential for such impacts to occur. The proposed project and cumulative projects would be required to comply with applicable provisions of these laws and regulations. Through compliance with these requirements, the potential for impacts would be reduced. Therefore, based on compliance with these requirements, the incremental impacts of the proposed project combined with impacts of other projects in the area would not cause a significant cumulative impact to the risk of loss, injury or death related to seismically-induced groundshaking, liquefaction, or expansive soils. The proposed project's contribution to cumulative effects would not be cumulatively considerable, and this impact would be less than significant.

Once the proposed project and the cumulative projects have completed construction, there would be no further potential to encounter paleontological resources. There would be no potential cumulative impacts associated with paleontological resources during project operation.

Mitigation Measures

Implement Mitigation Measures PALEO-1 and PALEO-2.

Significance Determination

Less than Significant Impact with Mitigation

3.7.4 References

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3.8 Greenhouse Gas Emissions

This section provides a discussion of existing climate conditions and global climate change, existing regulations pertaining to global climate change, and potential greenhouse gas (GHG) emissions resulting from construction and operation of the proposed project, including cumulative impacts.

3.8.1 Environmental Setting

Greenhouse Gas Fundamentals

Greenhouse Gases

Global climate change refers to changes in average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation and storms. Historical records indicate that global climate changes have occurred in the past due to natural phenomena; however, current data increasingly indicate that the current global conditions differ from past climate changes in rate and magnitude. Global climate change attributable to anthropogenic (human) GHG emissions is currently one of the most important and widely debated scientific, economic and political issues in the United States and the world. The extent to which increased concentrations of GHGs have caused or will cause climate change and the appropriate actions to limit and/or respond to climate change are the subject of significant and rapidly evolving regulatory efforts at the federal and state levels of government.

GHGs are compounds in the Earth's atmosphere that play a critical role in determining temperature near the Earth's surface. More specifically, these gases allow high-frequency shortwave solar radiation to enter the Earth's atmosphere, but retain some of the low frequency infrared energy that otherwise is radiated back from the Earth towards space, resulting in a warming of the atmosphere.

Not all GHGs possess the same capacity to induce atmospheric warming; as a result, the warming contribution of a GHG is commonly quantified in the common unit of carbon dioxide equivalent (CO_2e) over a 100-year period, by applying the appropriate global warming potential (GWP) value.[1] By using the applicable GWP for each GHG, Project-related emissions can be tabulated in the common unit of metric tons per year CO_2e. GWP ratios are provided by the Intergovernmental Panel on Climate Change (IPCC). Historically, GHG emission inventories were calculated using the GWPs from the IPCC's Second Assessment Report (SAR), published in 1996. The IPCC has since updated the GWP values based on the latest science in its Fourth Assessment Report (IPCC AR4) and Fifth Assessment Report (IPCC AR5), published in 2007 and 2014, respectively (IPCC 2007; IPCC 2014). California Air Resources Board (CARB) uses the AR4 GWPs in the Statewide GHG emissions inventory, in the current Climate Change Scoping Plan, and in the current version of the California Emissions Estimator Model (CalEEMod) that is used to calculate CO_2e values for construction as well as operations for

[1] GWPs and associated CO_2e values were developed by the IPCC, and published in its Second Assessment Report (SAR) in 1996. Historically, GHG emission inventories have been calculated using the GWPs from the IPCC's SAR. The IPCC updated the GWP values based on the latest science in its AR4. The CARB reports GHG emission inventories for California using the GWP values from the IPCC AR4.

existing and proposed project build-out conditions. Compounds that are regulated as GHGs are discussed below (CARB 2019; CARB 2017a; CAPCOA 2017).

Carbon Dioxide (CO_2): CO_2 is the most abundant anthropogenic GHG in the atmosphere and is primarily generated from fossil fuel combustion from stationary and mobile sources. CO_2 is the reference gas (GWP of 1) for determining the GWPs of other GHGs. CO_2 accounted for approximately 83 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

Methane (CH_4): CH_4 is emitted from biogenic sources (i.e., resulting from the activity of living organisms), incomplete combustion in forest fires, anaerobic decomposition of organic matter in landfills, manure management, and leaks in natural gas pipelines. The GWP of CH_4 is 25 in the IPCC AR4. CH_4 accounted for approximately 9 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

Nitrous Oxide (N_2O): N_2O produced by human-related sources including agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of N_2O is 298 in the IPCC AR4. N_2O emissions accounted for approximately 3 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

Hydrofluorocarbons (HFCs): HFCs are fluorinated compounds consisting of hydrogen, carbon, and fluorine. They are typically used as refrigerants in both stationary refrigeration and mobile air conditioning systems. The GWPs of HFCs range from 124 for HFC-152a to 14,800 for HFC-23 in the IPCC AR4. HFCs and PFCs (see below) combined accounted for approximately 5 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

Perfluorocarbons (PFCs): PFCs are fluorinated compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semiconductor manufacturing. The GWPs of PFCs range from 7,390 to 17,700 in the IPCC AR4 AR4 and accounted for less than 1 percent of anthropogenic GHG emissions (CO_2e) in California in 2016

Sulfur Hexafluoride (SF_6): SF_6 is a fluorinated compound consisting of sulfur and fluoride. It is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. SF_6 has a GWP of 22,800 in the IPCC AR4. SF_6 emissions accounted for less than 1 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

Effects of Climate Change

The scientific community's understanding of the fundamental processes responsible for global climate change has improved over the past decade, and its predictive capabilities are advancing. However, there remain scientific uncertainties in, for example, predictions of local effects of climate change, occurrence, frequency, and magnitude of extreme weather events, effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. Due to the complexity of and inability to accurately model Earth's climate system, the uncertainty surrounding climate change may never be completely eliminated. Nonetheless, the

IPCC's AR5 states that is extremely likely that the dominant cause of the observed warming since the mid-20th century is the anthropogenic increase in GHG concentrations (IPCC 2014). A report from the National Academy of Sciences concluded that 97 to 98 percent of the climate researchers most actively publishing in the field support the tenets of the IPCC in that climate change is very likely caused by human (i.e., anthropogenic) activity (Anderegg 2010).

The IPCC's AR4, found that the potential impacts in California due to global climate change include: loss in snow pack; sea-level rise; more extreme heat days per year; more high ozone days; more extreme forest fires; more severe droughts punctuated by extreme precipitation events; increased erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Deltas and associated levee systems; and increased pest infestation (OPR 2018). The Fourth Assessment's findings are consistent with climate change studies published by the California Natural Resources Agency (CNRA) since 2009, starting with the *California Climate Adaptation Strategy* as a response to the Governor's Executive Order S-13-2008. In 2014, the CNRA rebranded the first update of the 2009 adaptation strategy as the *Safeguarding California Plan* (CNRA 2009; CNRA 2014). The 2018 update to *Safeguarding California Plan* identifies hundreds of ongoing actions and next steps State agencies are taking to safeguard Californians from climate impacts within a framework of 81 policy principles and recommendations (CNRA 2018).

In 2016, the CNRA released *Safeguarding California: Implementation Action Plans* in accordance with Executive Order B-30-15, identifying a lead agency to lead adaptation efforts in each sector. In accordance with the 2009 *California Climate Adaptation Strategy*, the California Energy Commission (CEC) was directed to develop a website on climate change scenarios and impacts that would be beneficial for local decision makers. The website, known as Cal-Adapt, became operational in 2011 (Cal-adapt 2020). The information provided on the Cal-Adapt website represents a projection of potential future climate scenarios comprised of local average values for temperature, sea-level rise, snowpack and other data representative of a variety of models and scenarios, including potential social and economic factors.

Global Emissions Inventory

Global GHG estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC). Worldwide man-made emissions of GHGs were approximately 49 billion metric tons CO_2e in 2010, including ongoing emissions from industrial and agricultural sources and emissions from land use changes (e.g., deforestation). Emissions of CO_2, primarily from fossil fuel use and industrial processes, account for 76 percent of total GHG (CO_2e) emissions. Methane emissions account for 16 percent and N_2O emissions for 6.2 percent. For comparison, worldwide emissions of GHGs in 1970 were 27 billion metric tons of CO_2e per year (IPCC 2014).

United States Emissions Inventory

In 2018, the United States emitted about 6,677 million metric tons (MMT) of CO_2e, with 75.4 percent of those emissions coming from fossil fuel combustion. Of the major sectors nationwide, transportation accounts for the highest amount of GHG emissions (approximately 28 percent), followed by electricity (27 percent), industry (22 percent), agriculture (10 percent), commercial and residential buildings (12 percent). Between 1990 and 2018, total US GHG

emissions rose by 3.7 percent, but emissions have generally decreased since peaking in 2005. GHG emissions in 2018 are approximately 10 percent below 2005 levels. Since 1990, US emissions have increased at an average annual rate of 0.2 percent, however they have been decreasing at an average annual rate of 0.7 percent since 2005 (USEPA 2020b).

California Greenhouse Gas Emissions Inventory

CARB compiles GHG inventories for the State. Based on the 2017 GHG inventory data (i.e., the latest year for which data are available from CARB), California emitted 424 $MMTCO_2e$ including emissions resulting from imported electrical power (CARB 2019). CARB's 2017 Statewide inventory indicated that California's net GHG emissions in 2017 were 7 $MMTCO_2e$ below 1990 levels, which is the 2020 GHG reduction target codified in AB 32. The overall trends in the inventory demonstrate that the carbon intensity of California's economy is declining and has decreased by 41 percent from 2001 peak emissions while increasing the gross domestic product (GDP) by 52 percent (CARB 2019).[2] The GDP grew 3.6 percent in 2017 while emissions per GDP declined by 4.5 percent compared to 2016. **Table 3.8-1** identifies and quantifies Statewide anthropogenic GHG emissions and sinks (e.g., carbon sequestration due to forest growth) in 1990 and 2017. As shown in the table, the transportation sector is the largest contributor to Statewide GHG emissions at approximately 40 percent (CARB 2019).

TABLE 3.8-1
STATE OF CALIFORNIA GREENHOUSE GAS EMISSIONS

Category	Total 1990 Emissions Using IPCC SAR ($MMTCO_2e$)	Percent of Total 1990 Emissions	Total 2017 Emissions Using IPCC AR4 ($MMTCO_2e$)	Percent of Total 2017 Emissions
Transportation	150.7	35%	169.9	40%
Electric Power	110.6	26%	62.4	15%
Commercial Use	14.4	3%	15.1	4%
Residential	29.7	7%	26.0	6%
Industrial	103.0	24%	89.4	21%
Recycling and Waste[a]	–	–	8.9	2%
High GWP/Non-Specified[b]	1.3	<1%	20.0	5%
Agriculture/Forestry	23.6	6%	32.4	8%
Forestry Sinks	-6.7	-2%	—[c]	—
Net Total (IPCC SAR)	**426.6**	**100%**[e]	—	—
Net Total (IPCC AR4)[d]	**431**	**100%**[e]	**424.1**	**100%**[e]

NOTES:

[a] Included in other categories for the 1990 emissions inventory.
[b] High GWP gases are not specifically called out in the 1990 emissions inventory.
[c] Revised methodology under development (not reported for 2012).
[d] CARB revised the State's 1990 level GHG emissions using GWPs from the IPCC AR4.
[e] Total of individual percentages may not add up to 100% due to rounding

SOURCES: CARB 2017b; CARB 2019.

[2] Carbon intensity of California's economy is the amount of carbon pollution per million dollars of gross domestic product.

3.8.2 Regulatory Setting

Federal

Clean Air Act

The 1963 CAA was the first federal legislation regarding air pollution control and has been amended numerous times in subsequent years, with the most recent amendments occurring in 1990. At the federal level, USEPA is responsible for implementation of certain portions of the CAA including mobile source requirements.

In *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007), twelve states and cities, including California, together with several environmental organizations, sued to require the USEPA to regulate GHGs as pollutants under the CAA. The United States Supreme Court ruled that GHGs fit within the CAA's definition of a pollutant and the USEPA had the authority to regulate GHGs.

On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under *CAA* Section 202(a):

- **Endangerment Finding:** The current and projected concentrations of the six key GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

These findings did not, by themselves, impose any requirements on industry or other entities. However, these actions were a prerequisite for implementing GHG emissions standards for motor vehicles.

On-Road Vehicle Rules

Heavy-Duty Vehicles

GHG emissions and fuel efficiency standards for medium- and heavy-duty trucks have been jointly developed by the USEPA and the National Highway Traffic Safety Administration (NHTSA). For vocational vehicles, which consist of a variety of work vehicles including dump trucks, the Phase 1 Heavy-Duty Vehicle Greenhouse Gas Regulation started with model year 2014 and the standard requires up to a 10 percent reduction in CO_2 emissions by model year 2017 over the 2010 baseline. The Phase 2 standards start in model year 2021 and require the phase-in of a 12 to 24 percent reduction in CO_2 emission reduction from vocational vehicles by model year 2027 over the 2017 baseline.

Light-Duty Vehicles

In August 2018, the USEPA and NHTSA proposed the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule that would, if adopted, maintain the CAFE and CO_2 standards applicable in model year 2020 for model years 2021 through 2026. The estimated CAFE and CO_2 standards for model year 2020 are 43.7 mpg and 204 grams of CO_2 per mile for passenger cars and 31.3 mpg and 284

grams of CO_2 per mile for light trucks, projecting an overall industry average of 37 mpg, as compared to 46.7 mpg under the standards issued in 2012. In September 2019, the USEPA published the final rule in the Federal Register (Federal Register, Vol. 84, No. 188, Friday, September 27, 2019, Rules and Regulations, 51310-51363). The USEPA also published the final rule for the One National Program on Federal Preemption of State Fuel Economy Standards that finalizes critical parts of the SAFE Vehicles Rule and makes clear that federal law preempts State and local tailpipe GHG emissions standards as well as zero emission vehicle (ZEV) mandates. In November 2019, California and 23 other states, environmental groups, and the cities of Los Angeles and New York, filed a petition with the U.S. Court of Appeals for the District of Columbia Circuit, for the EPA to reconsider the published rule. Additional lawsuits were filed by California and others in May 2020 against the finalized rules. The Court has not yet ruled on the lawsuits.

State

California Greenhouse Gas Reduction Targets

Through executive order, California governors have established long-term GHG reduction goals for the State.

Executive Order S-3-05

On June 1, 2005, Governor Schwarzenegger announced Executive Order S-3-05, which established the following GHG emission reduction targets:

- By 2010, California shall reduce GHG emissions to 2000 levels;
- By 2020, California shall reduce GHG emissions to 1990 levels; and
- By 2050, California shall reduce GHG emissions to 80 percent below 1990 levels.

Executive Order B-30-15

On April 29, 2015, Governor Brown issued Executive Order B-30-15, in which, the Governor:

- Established a new interim Statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030;
- Ordered all state agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets; and
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

California Health and Safety Code, Division 25.5 – California Global Warming Solutions Act of 2006 (AB 32)

Following the issuance of Executive Order S-3-05, in 2006, the California State Legislature adopted the California Global Warming Solutions Act of 2006 (passed as Assembly Bill [AB] 32 and codified in the California Health and Safety Code [HSC], Division 25.5), which focuses on reducing GHG emissions in California to 1990 levels by 2020. HSC Division 25.5 defines GHGs as CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 and represents the first enforceable Statewide program

to limit emissions of these GHGs from all major industries with penalties for noncompliance. The law further requires that reduction measures be technologically feasible and cost effective.

Under HSC Division 25.5, CARB has the primary responsibility for reducing GHG emissions. CARB is required to adopt rules and regulations directing State actions that would achieve GHG emissions reductions equivalent to 1990 Statewide levels by 2020.

Senate Bill 32

In 2016, Senate Bill (SB) 32 and its companion bill AB 197, augmented AB 32 and amended HSC Division 25.5, establishing a new climate pollution reduction target of 40 percent below 1990 levels by 2030 and including provisions to ensure the benefits of State climate policies reach into disadvantaged communities.

2017 Climate Change Scoping Plan Update

CARB approved the most recent 2017 Climate Change Scoping Plan Update (2017 Scoping Plan Update) in December 2017 (CARB 2017a). The 2017 Scoping Plan Update outlines the proposed framework of action for achieving the 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990 levels (CARB 2017a). The 2017 Scoping Plan Update identifies key sectors of the State's implementation strategy, which includes improvements in low-carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. Through a combination of data synthesis and modeling, CARB determined that the target Statewide 2030 emissions limit is 260 $MMTCO_2e$, and that further commitments will need to be made to achieve an additional reduction of 50 $MMTCO_2e$ beyond current policies and programs. The cornerstone of the 2017 Scoping Plan Update is an expansion of the Cap-and-Trade Program (discussed further below) to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2030 limit set forth by E.O. B-30-15.

The 2017 Scoping Plan Update's strategy for meeting the State's 2030 GHG target incorporates the full range of legislative actions and State-developed plans that have relevance to the year 2030, including the following, described elsewhere in this section:

- Extending the low-carbon fuel standard (LCFS) beyond 2020 and increasing the carbon intensity reduction requirement to 18 percent by 2030;
- SB 350, which increases the Renewables Portfolio Standard (RPS) to 50 percent by 2030 and requires the CEC to establish annual targets for Statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of Statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by 2030. These targets may be achieved through energy efficiency savings and demand reductions from a variety of programs, including but not limited to appliance and building energy efficiency standards and a comprehensive program to achieve greater energy efficiency standards in existing buildings;
- The 2016 Mobile Source Strategy is estimated to reduce emissions from mobile sources including an 80 percent reduction in smog-forming emissions and a 45 percent reduction in diesel particulate matter from 2016 levels in the Air Basin, a 45 percent reduction in Statewide GHG emissions (from both on-road and off-road mobile sources) and a 50 percent reduction in Statewide consumption of petroleum-based fuels;

- The Sustainable Freight Action Plan to improve freight efficiency and transition to zero emission freight handling technologies (described in more detail below);
- SB 1383, which requires a 50 percent reduction in anthropogenic black carbon and a 40 percent reduction in hydrofluorocarbon and methane emissions below 2013 levels by 2030; and
- AB 398, which extends the State Cap-and-Trade Program through 2030.

In the 2017 Scoping Plan Update, CARB recommends Statewide targets of no more than six MT CO_2e per capita by 2030 and no more than two metric tons CO_2e per capita by 2050. CARB acknowledges that because the Statewide per capita targets are based on the Statewide GHG emissions inventory that includes all emissions sectors in the state (including large industrial sources covered under the State's cap and trade program), they are not applicable for use at the local level. Rather, it is appropriate for local jurisdictions to derive evidence-based local per-capita goals based on local emissions sectors and growth projections.

To demonstrate how a local jurisdiction can achieve their long-term GHG goals at the community plan level, CARB recommends developing a geographically specific GHG reduction plan (i.e., climate action plan) consistent with the requirements of *CEQA Guidelines* Section 15183.5(b). A so-called "CEQA-qualified" GHG reduction plan, once adopted, can provide local governments with a streamlining tool for project-level environmental review of GHG emissions, provided there are adequate performance metrics for determining project consistency with the plan. Absent conformity with such a plan, CARB recommends "that projects incorporate design features and GHG reduction measures, to the degree feasible, to minimize GHG emissions. Achieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development (CARB 2017a)."

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, increasing required energy from renewable sources for both investor-owned utilities and publicly owned utilities from 50 percent to 60 percent by December 31, 2030. Incrementally, these energy providers must also have a renewable energy supply of 44 percent by December 31, 2024, and 52 percent by December 31, 2027. The updated RPS goals are considered achievable, since many California energy providers are already meeting or exceeding the RPS goals established by SB 350.

On-Road and Off-Road Vehicle and Equipment Rules

Heavy-Duty Vehicles and Equipment

In 2004, CARB adopted an Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel PM and other TACs. The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel-fueled commercial vehicles to idle for more than 5 minutes at any given time. While the goal of this measure is primarily to reduce public health impacts from diesel emissions,

compliance with the regulation also results in GHG reductions in the form of reduced emissions from unnecessary idling.

In addition to limiting exhaust from idling trucks, in 2008 CARB approved the Truck and Bus regulation to reduce NO_X, PM10, and PM2.5 emissions from existing diesel vehicles operating in California (13 *CCR* Section 2025). The phased regulation aims to reduce emissions by requiring installation of diesel soot filters and encouraging the retirement, replacement, or retrofit of older engines with newer emission-controlled models. The phasing of this regulation has full implementation by 2023.

In addition to limiting exhaust from idling trucks, CARB adopted the In-Use Off-Road Diesel Vehicle Regulation that promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles. The regulation adopted by CARB on July 26, 2007, aims to reduce emissions by installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models. Implementation is staggered based on fleet size (which is the total of all off-road horsepower under common ownership or control), with the largest fleets to begin compliance by January 1, 2014. Each fleet must demonstrate compliance through one of two methods. The first option is to calculate and maintain fleet average emissions targets, which encourages the retirement or repowering of older equipment and rewards the introduction of newer cleaner units into the fleet. The second option is to meet the Best Available Control Technology (BACT) requirements by turning over or installing Verified Diesel Emission Control Strategies (e.g., engine retrofits) on a certain percentage of its total fleet horsepower. The compliance schedule requires that BACT turn overs or retrofits be fully implemented by 2023 in all equipment in large and medium fleets and across 100 percent of small fleets by 2028.

Light-Duty Vehicles

In 2002, Governor Davis signed AB 1493 (Pavley), which required CARB to set GHG emission standards for passenger vehicles, light duty trucks, and other vehicles whose primary use is non-commercial personal transportation manufactured in and after 2009. Because the Pavley standards (named for the bill's author, State Senator Fran Pavley) would impose stricter standards than those under the CAA, California applied to the USEPA for a waiver under the CAA. In 2009, the USEPA granted the waiver. The waiver has been extended consistently since 2009; however, in 2018 the USEPA and NHTSA indicated their intent to revoke California's waiver, and prohibit future State emissions standards enacted under the CAA. In response to the Federal SAFE Vehicles Rules and the One National Program on Federal Preemption of State Fuel Economy Standards, in November 2019 California and 23 other states, environmental groups, and the cities of Los Angeles and New York, filed a petition with the U.S. Court of Appeals for the District of Columbia Circuit, for the EPA to reconsider the published rule. Additional lawsuits were filed by California and others in May 2020 against the finalized rules. The Court has not yet ruled on the lawsuits.

Low Carbon Fuel Standard

In January 2007, Governor Schwarzenegger enacted Executive Order S-01-07, which mandates that the state: (1) establish a Statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and (2) adopt a Low Carbon Fuel Standard (LCFS) for transportation fuels in California. The overall goal of the LCFS is to lower the carbon intensity of California transportation fuel. The 2017 Scoping Plan Update calls for the LCFS to reduce fuel carbon intensity by at least 18 percent by 2030. In September 2018, CARB extended the LCFS program to 2030, making significant changes to the design and implementation of the Program including a doubling of the carbon intensity reduction to 20 percent by 2030.

Local

Kern County General Plan

The Kern County General Plan (Kern County 2009), originally adopted on June 15, 2004, and last amended on September 22, 2009, contains the following policies with regard to GHGs.

Land Use, Conservation, and Open Space Element – Air Quality

> **Policy 18:** The air quality implications of new discretionary land use proposals shall be considered in approval of major developments. Special emphasis will be placed on minimizing air quality degradation in the desert to enable effective military operations and in the valley region to meet attainment goals.
>
> **Policy 19:** In considering discretionary projects for which an Environmental Impact Report must be prepared pursuant to the California Environmental Quality Act, the appropriate decision making body, as part of its deliberations, will ensure that:
>
> (a) All feasible mitigation to reduce significant adverse air quality impacts have been adopted; and
>
> (b) The benefits of the proposed project outweigh any unavoidable significant adverse effects on air quality found to exist after inclusion of all feasible mitigation. This finding shall be made in a statement of overriding considerations and shall be supported by factual evidence to the extent that such a statement is required pursuant to the California Environmental Quality Act.
>
> **Policy 22:** Kern County shall continue to work with the San Joaquin Valley Unified Air Pollution Control District and the Kern County Air Pollution Control District toward air quality attainment with federal, State, and local standards.

San Joaquin Valley Air Pollution Control District - District Policy

The San Joaquin Valley Air Pollution Control District (SJVAPCD) published the District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency (SJVAPCD, 2009) in December 2009. This District Policy applies to projects for which the District has discretionary approval authority over the project and serves as lead agency for CEQA purposes. The District Policy establishes an approach to streamline the determination of project GHG emissions significance through the incorporation of Best Performance Standards (BPS). According to the SJVAPCD, BPS are defined as the most effective means of reducing or limiting GHG emissions from a GHG emissions source.

According to the SJVAPCD, projects implementing BPS would be determined to have a less than significant individual and cumulative impact on global climate change and would not require GHG quantification. Projects exempt from the requirements of CEQA, and projects complying with an approved GHG emission reduction plan or mitigation program would also be determined to have a less than significant individual and cumulative impact on global climate change and would not require project specific quantification of GHG emissions (SJVAPCD 2009). Quantification of project specific GHG emissions would be required for projects not implementing BPS. Such projects must be determined to have reduced or mitigated operational GHG emissions by 29 percent from business as usual (BAU), consistent with GHG reduction targets established in AB 32, in order to be considered to have a less than significant individual and cumulative impact for GHGs.

3.8.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to GHG. The proposed project would have a significant impact if it would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA 2008). The project's construction-related (temporary, short-term) emissions of GHGs and whether they would result in a cumulatively considerable contribution to global climate change are described below. Pursuant to *CEQA Guidelines* Section 15064.7(a), the EIR is employing both quantitative and qualitative thresholds of significance.

The SJVAPCD's methodology described above is geared toward long-term operational activities of land use development projects rather than infrastructure projects. However, since 82 percent of the project's GHGs are associated with electricity use (pumps and water conveyance), and PG&E is covered by cap-and-trade, the BAU criterion was deemed inapplicable for this project. The electricity provider is already compliant with and exceeding California's mandates for reducing the emissions of GHGs. Therefore, it is important to evaluate the majority of the proposed project's GHG emissions using a more applicable threshold. In light of the lack of established GHG emissions thresholds that would apply to the proposed project, CEQA allows lead agencies to identify thresholds of significance applicable to a proposed project that are supported by substantial evidence. In the case of GHG emissions and pursuant to the Appendix G checklist question, thresholds should also be linked with the Scoping Plan, which is the adopted plan for the State to meet GHG reduction targets.

Therefore, to establish additional context in which to consider the order of magnitude of the proposed project's related GHG emissions, this analysis accounts for the following considerations by other government agencies and associations about what levels of GHG emissions constitute a cumulatively considerable incremental contribution to climate change:

- Under AB 32, facilities (stationary, continuous sources of GHG emissions) that generate more than 25,000 metric tons (MT) of CO_2e per year must report their GHG emissions to CARB.
- The Bay Area Air Quality Management District (BAAQMD) adopted 10,000 $MTCO_2e$ per year as the significance threshold for operational GHG emissions from stationary-source projects (BAAQMD 2017).
- The South Coast Air Quality Management District (SCAQMD) adopted 10,000 $MTCO_2e$ per year as the significance threshold for stationary source permitting projects for which the SCAQMD is the lead agency (SCAQMD 2008).

Since the majority of project GHG emissions are associated with stationary-source electricity use, the 10,000 $MTCO_2e$ per year threshold will be applied to the impact assessment for the proposed project.

Methodology

Construction and operational emissions were calculated by using California Emissions Estimator Model (CalEEMod) version 2016.3.2. CalEEMod is the SJVAPCD-recommended emissions inventory software program that can be used to estimate anticipated emissions associated with land development projects in California. On-road mobile source emissions were estimated using the 2017 CARB on-road vehicle emissions factor model (EMFAC) and incorporating the adjustment factors for the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part I: One National Program (SAFE Rule Part I) for light-duty vehicles (i.e., worker vehicles).

As described in the Chapter 2, *Project Description*, of this Draft EIR, construction of the proposed recharge, recovery and conveyance facilities is anticipated to be built over two phases. Construction would begin with Phase 1 in fall 2021, with the Phase 1 recharge facilities ready to receive water by 2022, subject to variation of the construction schedule. Construction of Phase 2 facilities is anticipated to begin in 2022. Construction of the project will be in multiple sequential or concurrent segments, each ranging from approximately 3 months to 40 months. The project is anticipated to be completed by fall 2026, subject to variations in the construction schedule (see Chapter 2, *Project Description*, of this Draft EIR for additional details).

The input values used in this analysis were adjusted to be project-specific based on construction equipment and construction schedule assumptions developed with the Authority. Haul truck trips and concrete truck trip estimates were based on excavation and required concrete amounts developed with the Authority. Demolition debris haul truck VMT were based on a 20-mile one-way trip based on default calculation methodologies in CalEEMod. As described in Chapter 2, *Project Description*, of this Draft EIR, the project's facilities were designed in an effort to balance earthwork on site, such that all excavated soils are redistributed and utilized to construct the project facilities, requiring no imported materials and leaving no excess materials; therefore it

was conservatively assumed that half of the excavated soils during project construction would be balanced locally while the other half would require movement by haul trucks to other portions of the project area where soil haul truck VMT were based on a 4.0 mile one-way trip for the Phase 1 site and a 2.6 mile one-way trip for Phase 2 site (approximately equivalent to the distance from the central areas to the outmost areas of Phase 1 and Phase 2, respectively). Water, vendor and concrete truck trip VMT were based on a 25-mile one-way trip. Worker trip estimates were based on default calculation methodologies in CalEEMod (worker trips equal 16.8 miles).

As described in the Chapter 2, *Project Description*, of this Draft EIR, operations of the project would include maintenance activities including weed and pest control and periodic earthwork operations. Weed and pest control operations would be conducted as necessary, which could occur up to four times a year, utilizing products approved for aquatic use in order to protect and preserve groundwater quality. Periodic earthwork operations would be required to maintain levees, enhance soil permeability, and remove vegetative growth. Earthwork would involve disking or scraping the basins to remove the top layer (e.g., one inch) of sediment, approximately once every three years. Operational emissions were modeled for the worse-case year in which four weed and pest control occurrences and all maintenance earthwork could occur within the same year.

It is estimated that the proposed project would be able to recharge and store upwards of 100,000 AFY. To achieve this amount of recharge, under conditions where source waters could not be conveyed via gravity, each pump station operating at approximately 30 kwh/AF would result in up to approximately 3,000,000 kilowatt hours per year (kwh/year), for a total of up to 9,000,000 kwh/year for all three pump stations combined. This energy requirement would be as needed and thus intermittent, rather than permanent and sustained. Recovery wells also would be powered by the existing electrical grid. Recovery wells typically would operate at approximately 600 kwh/AF. Based on this, to achieve recovery of approximately 50,000 AFY, up to approximately 30,000,000 kwh/year would be required. Therefore, the maximum electricity the project could consume was estimated at up to 39,000,000 kwh/year.

For this analysis, the results are expressed in metric tons per year and are compared with the applied mass thresholds to determine impact significance. Appendix C of this Draft EIR provides detailed emission calculations used in this analysis.

Impact Analysis

Greenhouse Gas Emissions

Impact 3.8-1: The proposed project could generate greenhouse gas emissions, either directly or indirectly, that would not have a significant impact on the environment. (*Less than Significant Impact*)

The following activities associated with the proposed project could contribute to the generation of GHG emissions:

- ***Off-road Equipment Activities*.** Construction equipment typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, methane, and N_2O. Furthermore, methane is emitted during the fueling of heavy equipment.

- ***Electricity.*** Electricity use can result in GHG production if the electricity is generated by combustion of fossil fuel. Default GHG emission factors for PG&E are included in CalEEMod.
- ***Motor Vehicle Use.*** Transportation associated with the project construction and operations would result in GHG emissions from the combustion of fossil fuels in automobile and truck trips.

Construction and operational emissions due to off-road equipment activities were modeled using CalEEMod software. Construction and operational on-road mobile source emissions were estimated using the 2017 CARB on-road vehicle emissions factor model (EMFAC) and incorporating the adjustment factors for the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part I: One National Program (SAFE Rule Part I) for light-duty vehicles (i.e., worker vehicles). Operational emissions due to electricity use from pump stations and recovery wells were based on estimated project energy consumption and CO_2 intensity factors linearly adjusted to account for RPS standards, and default methane, and N_2O intensity factors. The construction and operational emissions were then compared to the 10,000 metric tons of CO_2e per year threshold, as described above.

Estimated GHG emissions associated with the proposed project construction are depicted in **Table 3.8-2** below. One-time, short-term construction GHG emissions are typically summed and amortized over the Project's lifetime (assumed to be 30 years) (CARB 2015). Project construction would continue until fall of 2026, with the project being operational in fall of 2026. However, in year 2026, while there is technically enough time for the worst-case scenario of operational maintenance activities to occur simultaneously during the few months of the project operations for year 2026, only a portion of the project's recharge capacity and subsequent energy consumption could occur during the partial project operations of the year 2026, which is the main source of the project's total GHG emissions. Therefore, conservatively **Table 3.8-3** presents emissions for the first full year of project operations in 2027 and includes the amortized construction emissions in order to determine the impact. As shown, the emissions from construction and operations would be below the significance threshold and the impacts would be less than significant without mitigation.

TABLE 3.8-2
ESTIMATED EMISSIONS OF GREENHOUSE GASES FROM CONSTRUCTION OF THE PROJECT

Source	Emissions (metric tons of CO_2e per year)
Construction Year 1 – 2021	832
Construction Year 2 – 2022	1,849
Construction Year 3 – 2023	2,312
Construction Year 4 – 2024	1,496
Construction Year 5 – 2025	943
Construction Year 6 - 2026	312
Total Construction GHG Emissions	7,745
Amortized Construction Emissions (30-years)	258

ESA 2020.

TABLE 3.8-3
ESTIMATED EMISSIONS OF GREENHOUSE GASES FROM OPERATION OF THE PROJECT

Source[a]	Emissions (metric tons of CO_2e per year)
Construction (Amortized)	258
Off-road Equipment – Operational Maintenance	225
Energy[a]	2,893
On-road Motor Vehicle Trips – Operational Maintenance	151
Total Project GHG Emissions (Construction + Operations)	3,527
Threshold	10,000
Significant (Yes or No)?	No

a As the worst-case analysis, recharge and recovery operations associated with the proposed project were assumed to occur in the same year where the maximum electricity the project could consume was estimated at up to 39,000,000 kwh/year.

ESA 2020.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Greenhouse Gas Emissions Plans

Impact 3.8-2: The proposed project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. (*Less than Significant Impact*)

California's Climate Scoping Plan calls for local governments to reduce GHG emissions through the adoption of local programs as an important strategy to reduce community scale GHG emissions. However, Kern County has not yet adopted a Climate Action Plan.

As of 2018, the electricity provider for the project, PG&E, generates 39 percent of electricity from renewable sources (PG&E 2018). Under SB 100, PG&E would have to increase its renewable sources for electricity to 50 percent by year 2026, 52 percent by year 2027, 60 percent by year 2030 and 100 percent by year 2045, which would result in declining GHG emissions into the future as PG&E would be required to supply cleaner electricity in future years. As discussed above, 82 percent of the project's GHGs for the project's first full operational year are associated with electricity use (pumps and water conveyance) and the electricity provider for the project, PG&E, is covered by cap-and-trade and is already compliant with California's efforts to reduce GHGs. In addition, a number of Scoping Plan Recommended Actions targeted at the transportation sector would be applicable to construction equipment and maintenance vehicles associated with the proposed project.

The Heavy-Duty Vehicle and Light-Duty vehicle rules have been established to reduce CO_2 emissions from the combustion of fossil fuels. The proposed project would not involve the manufacture of vehicles or production of vehicle fuels. However, vehicles that are purchased and used within the project site would comply with any vehicle and fuel standards that the CARB adopts or has adopted. Therefore, the construction and operation of the proposed project would not conflict with these regulations.

CARB's ATCM limits heavy-duty diesel motor vehicle idling to reduce DPM and other TACs and applies to all the haul trucks, heavy duty vendor trucks, and construction equipment that would be used on the project site. CARB also implemented the Truck and Bus Regulation to further reduce NOx, PM10 and PM2.5 from on-road diesel operating vehicles. CARB has also promulgated emissions standards for off-road diesel construction equipment greater than 24 horsepower to reduce criteria pollutant emissions. While these CARB regulations primarily target reductions in criteria air pollutant emission, they have co-benefits of minimizing GHG emissions due to improved engine efficiencies and reduction of idling times. The proposed project would operate both on- and off-road trucks and construction equipment. These vehicles would comply with all of the CARB regulations and onsite trucks and equipment would be monitored to ensure that idling would occur for only five minutes at any given time. Therefore, the proposed project would be consistent with the applicable regulations for heavy-duty, light-duty and off-road vehicles and equipment and impacts would be less than significant.

In summary, the proposed project would not conflict with any applicable plans, policies, or regulations adopted for the purpose of reducing GHG emissions and reaching future anticipated Statewide GHG reductions goals. CARB has outlined a number of potential strategies and regulations for achieving the 2030 reduction target of 40 percent below 1990 levels, as mandated by SB 32. These potential strategies and regulations to reduce GHGs include using renewable resources for State electricity, which the project will benefit from as described above, as well as increasing the fuel economy of vehicles and the number of zero-emission or hybrid vehicles, supporting other alternative transportation options, reducing the rate of growth in VMT and associated GHG emissions , and use of high-efficiency appliances, water heaters, and HVAC systems that reduce or replace the use of fossil fuels with cleaner energy and reduces associated GHG emissions (Energy + Environmental Economics, 2015). Thus, as the proposed project would not conflict with any applicable plans, policies, or regulations adopted for the purpose of reducing GHG emissions and reaching future anticipated Statewide GHG reductions goals, there would be a less than significant impact.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

3.8.4 References

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3.9 Hazards and Hazardous Materials

This section evaluates the potential hazards and hazardous materials impacts associated with construction and operation of the proposed project. This section includes: a description of the existing hazards and hazardous materials within the project area; a summary of applicable regulations related to hazards and hazardous materials; and an evaluation of the potential impacts of the proposed project related to the hazard conditions within the project area and in the surrounding area, including cumulative impacts.

3.9.1 Environmental Setting

Definitions

Definitions of terms used in the characterization of baseline conditions, regulatory framework, and impact analysis for hazards and hazardous materials are provided below:

- **Hazardous Material:** The term "hazardous material" can have varying definitions depending on the regulatory programs. For the purposes of this EIR, the term refers to both hazardous materials and hazardous wastes. The *California Health and Safety Code* Section 25501(n) defines hazardous material as: Hazardous material means any material that because of its quantity, concentrations, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.
- **Hazardous Waste:** A "hazardous waste" is a waste that because of its quantity, concentration, or physical, chemical, or infectious characteristic, may cause or significantly contribute to an increase in mortality or illness or pose substantial or potential threats to public health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed (42 U.S.C. 6903(5)). Hazardous wastes are further defined under the Resource Conservation and Recovery Act (RCRA) as substances exhibiting the characteristics of ignitability, reactivity, corrosivity, or toxicity. Chemical-specific concentrations used to define whether a material is a hazardous, designated, or nonhazardous waste include Total Threshold Limit Concentrations (TTLCs), Soluble Threshold Limit Concentrations (STLCs), and Toxic Characteristic Leaching Procedure (TCLPs), listed in *California Code of Regulations* (CCR) Title 22, Chapter 11, Article 3, Section 66261, and are used as waste acceptance criteria for landfills. Waste materials with chemical concentrations above TTLCs, STLCs, and TCLPs must be sent to Class I disposal facilities, may be sent to Class II disposal facilities depending on the waste material, and may not be sent to Class III disposal facilities.[1]
- **Acutely Hazardous Waste:** Waste that has been found to be fatal to humans in low doses, or is otherwise capable of causing or significantly contributing to an increase in serious irreversible, or incapacitating reversible illness (40 CFR §261.11(2)).
- **Screening Levels for Hazardous Materials in Soil, Soil Gas, or Groundwater:** The U.S. Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) and San

[1] Class I disposal facilities are designed specifically for hazardous waste, as defined by CCR Title 22. Class II facilities are "designated" waste facilities and must acquire special permitting to accept designated types of hazardous materials. Class III disposal facilities are strictly for non-hazardous waste (CCR Title 23, Division 3, Chapter 15).

Francisco Bay Area Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESLs) are guidelines used to evaluate the potential risk associated with chemicals found in soil or groundwater where a release of hazardous materials has occurred. Although developed and maintained by the San Francisco Bay Area RWQCB, ESLs are used by regulatory agencies throughout the State. Screening levels have been established for both residential and commercial/industrial land uses, and for construction workers. Residential screening levels are the most restrictive. Soil with chemical concentrations below these screening levels generally would not require remediation and would be suitable for unrestricted uses if disposed of offsite.

Existing Project Area Conditions

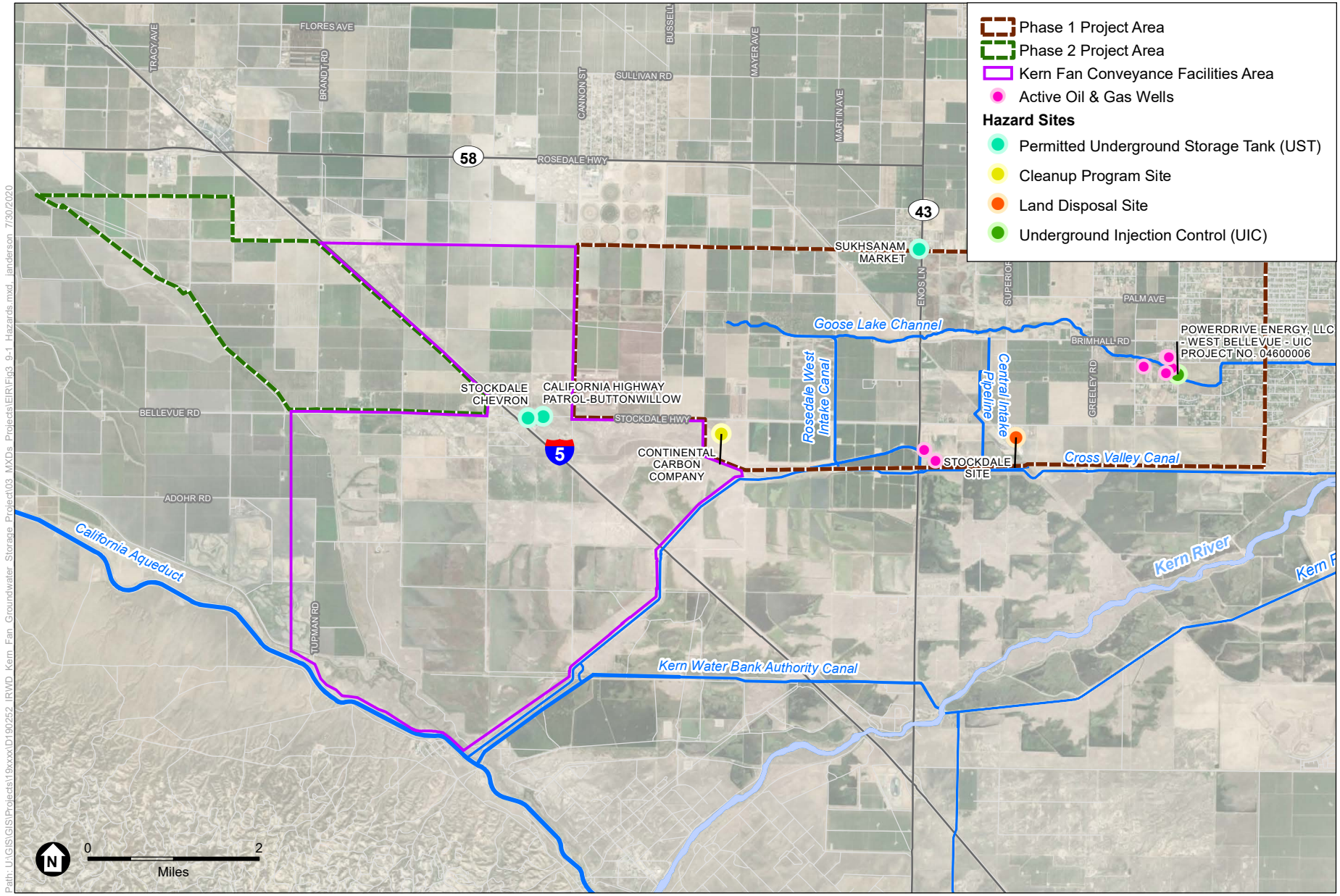
The project area is located in western Kern County within unincorporated county land and the City of Bakersfield (easternmost portion of Phase 1 area). The project area consists of Phase 1 and Phase 2 areas, as well as the Kern Fan Conveyance Facilities area (refer to Figure 2-1). The project area consists primarily of agricultural land, with scattered low-density communities, water recharge, recovery and conveyance infrastructure, and oil extraction facilities.

The Geologic Energy Management (GEM) Division identifies oilfields within the project area (CalGEM 2019). Active oil and gas wells within the project area are illustrated on **Figure 3.9-1** and existing wellfields are illustrated on Figure 3.12-1 within Section 3.12, *Mineral Resources,* of this Draft EIR. There are 6 currently active oil and gas wells within the Phase 1 area, two of which are located on Stockdale East, which is owned by Rosedale. The past historic oil, gas, and fluid injection activity within the project area have resulted in spillage, releases, and disposal onto the ground of oil, oil and water, and inert debris associated with oilfield production and storage (ESA 2015).

The project area has a long history of agricultural use. No evidence of hazardous substance releases from agricultural operations have been identified (ESA 2015). The project area contains various residential and agricultural structures such as barns, storage sheds, farming equipment, and supplies. Hazardous materials in use include fuels and oils, fertilizers, herbicides, and pesticides. It is expected that property owners conduct good housekeeping practices such as aboveground storage tanks (ASTs) and chemical containers located within secondary containment structures or inside small buildings or sheds. It is not anticipated that the proposed project would involve changes to these local structures or facilities.

Hazardous Materials Database Search

The GeoTracker database, maintained by the State Water Resources Control Board (SWRCB) and the EnviroStor database, maintained by the Department of Toxic Substances Control (DTSC), were checked for nearby hazardous materials sites. The GeoTracker database includes the following hazardous materials site lists: leaking underground storage tank (LUST) cleanup sites; spills, leaks, investigation and cleanup (SLIC) sites; permitted underground storage tank (UST) facilities; land disposal sites; military cleanup sites; and other cleanup sites. The EnviroStor database includes federal Superfund, State response, voluntary cleanup, school cleanup, and hazardous waste corrective action. The DTSC is also responsible for updating the Hazardous Waste and Substances Site List (Cortese List). The list is a planning document used by State and local agencies and developers to comply with CEQA requirements by providing location information for hazardous material release sites.



SOURCE: ESRI; Kern County; Geotracker, 2020.

Kern Fan Groundwater Storage Project

Figure 3.9-1

Hazardous Materials Sites and Facilities

ESA

The search of the GeoTracker and EnviroStor databases identified one Cleanup Program Site and one Land Disposal Site within the project area (see Figure 3.9-1) (DTSC 2020a; SWRCB 2020a). Additionally, three Permitted USTs and one Underground Injection Control (UIC) site are within the project area. No other hazardous materials sites or facilities are located within one-quarter mile of the project area.

The "Open" Cleanup Program Site is called the Continental Carbon Company, and has been inactive as of August 10, 1987. According to SWRCB's GeoTracker, carbon black was produced at the site from 1960 to 1980 (SWRCB 2020b).[2] The potential contaminant of concern was asbestos. Wastewater from the site was disposed to nearby ponds. The United States Environmental Protection Agency (USEPA) conducted a site screening in 1988 and concluded that contamination of groundwater was not a major concern due to the immobility and insolubility of the particulates left in the soil. The DTSC completed a site screening in 1995 and contacted the SWRCB in 2010 indicating that it was pursuing further assessment of the site. All site files and studies have been transferred to DTSC. All structures and tanks on the site have been removed and all ponds leveled, as evidenced from 2013 aerial photographs. The land area has been leveled and is currently being farmed (SWRCB 2020b).

The "Open" Land Disposal Site is called the Stockdale Site, and has been active as of January 1965. The site is a Title 27, Municipal Solid Waste Landfill, meaning that the landfill is not permitted to accept hazardous waste. No contaminants of concern are specified for this site (SWRCB 2020c). To date, no cleanup actions have occurred on the site; however, Porter and Associates, Inc. was hired in 2017 through 2018 to remove remaining carbon black piles that exist onsite (SWRCB 2020c).

Schools

The project area is located within a quarter-mile of the Del Rio Elementary School and Bakersfield Christian High School, located at 600 Hidalgo Drive and 12775 Stockdale Highway in Bakersfield, respectively. The next closest school to the project area is the Rio Bravo Greeley School located at 6601 Enos Lane, which is approximately 2.5 miles north of the Phase 1 area, at the cross streets of Enos Lane and Rosedale Highway.

Airports

An Airport Land Use Compatibility Plan (ALUCP) exists for each of the airports in Kern County (County of Kern 2012). The project area is not located within the Kern County ALUCP. The nearest public commercial airport is Meadows Field Airport approximately 4 miles northeast of the project area.

[2] Carbon black (subtypes are acetylene black, channel black, furnace black, lamp black and thermal black) is a material produced by the incomplete combustion of heavy petroleum products such as FCC tar, coal tar, or ethylene cracking tar. Carbon black is a form of paracrystalline carbon that has a high surface-area-to-volume ratio, albeit lower than that of activated carbon. It is dissimilar to soot in its much higher surface-area-to-volume ratio and significantly lower polycyclic aromatic hydrocarbon (PAH) content. Carbon black is widely used as a model compound for diesel soot for diesel oxidation experiments. Carbon black is mainly used as a reinforcing filler in tires and other rubber products. In plastics, paints, and inks, carbon black is used as a color pigment.

Emergency Response

The Kern County Fire Department (KCFD) Emergency Operations Center (EOC) maintains the Emergency Operations Plan (EOP) for the County (KCFD 2020a; County of Kern 2008). The EOP does not identify any specific evacuation areas or routes within the project area (County of Kern 2008).

Wildfire

The California Department of Forestry and Fire Protection (CAL FIRE) publishes Fire Hazard Severity Zone (FHSZ) maps, for both State and Local Responsibility Areas (SRA and LRAs, respectively). The project area is mapped as being primarily no FHSZ zones, with some Moderate FHSZs (CAL FIRE 2020). However, there is a small portion of land north of the Phase 1 area that is considered a High FHSZ (CAL FIRE 2020). Please refer to Section 3.17, *Wildfire*, and Figure 3.17-1, Fire Hazard Severity Zones, for additional details.

3.9.2 Regulatory Setting

Federal

The primary federal agencies with responsibility for hazardous materials management include the USEPA, U.S. Department of Labor Occupational Safety and Health Administration (Fed/OSHA), and the U.S. Department of Transportation (USDOT). Federal laws, regulations, and responsible agencies are summarized in **Table 3.9-1**.

State and local agencies often have either parallel or more stringent rules than federal agencies. In most cases, State law mirrors or overlaps federal law and enforcement of these laws is the responsibility of the State or of a local agency to which enforcement powers are delegated. For these reasons, the requirements of the law and its enforcement are discussed under either the State or local agency section.

State

The primary State agencies with responsibility for hazardous materials management in the region include the DTSC and the Regional Water Quality Control Board (RWQCB) within the California Environmental Protection Agency (Cal EPA), California Occupational Safety and Health Administration (Cal/OSHA), California Department of Health Services (CDHS), California Highway Patrol (CHP), and the California Department of Transportation (Caltrans). State laws, regulations, and responsible agencies are summarized in **Table 3.9-2**.

TABLE 3.9-1
FEDERAL LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible Federal Agency	Description
Hazardous Materials Management	Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA))	Imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of, and to prevent or mitigate injury to human health or the environment in the event that such materials are accidentally released.
Hazardous Waste Handling	Resource Conservation and Recovery Act of 1976 (RCRA)	Under RCRA, the USEPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave."[a]
	Hazardous and Solid Waste Act	Amended RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
Hazardous Materials Transportation	U.S. Department of Transportation (USDOT)	USDOT has the regulatory responsibility for the safe transportation of hazardous materials. The USDOT regulations govern all means of transportation except packages shipped by mail (49 CFR).
	U.S. Postal Service (USPS)	USPS regulations govern the transportation of hazardous materials shipped by mail.
Occupational Safety	Occupational Safety and Health Act of 1970	Fed/OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries (29 CFR 1910).
Structural and Building Components (Lead-based paint, polychlorinated biphenyls, and asbestos)	Toxic Substances Control Act	Regulates the use and management of polychlorinated biphenyls in electrical equipment, and sets forth detailed safeguards to be followed during the disposal of such items.
	USEPA	The USEPA monitors and regulates hazardous materials used in structural and building components and their effects on human health.

NOTES:

[a] "Cradle-to-grave" is used by the USEPA in this context to mean that it (the USEPA) regulates hazardous waste from its generation to its disposal (USEPA 2020).

TABLE 3.9-2
STATE LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible State Agency	Description
Hazardous Materials Management	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program); CUPA (Health and Safety Code Sections 25404 et seq.)	In January 1996, Cal EPA adopted regulations, which implemented a Unified Program at the local level. The agency responsible for implementation of the Unified Program is called the Certified Unified Program Agency (CUPA), which for the Kern County, is the Kern County Fire Department (KCFD). The following programs are consolidated under the unified program: • Hazardous Materials Release Response Plans, and Inventory (also referred to as Hazardous Materials Business Plans) • California Accidental Release Program (CalARP) • Underground Storage Tanks • Aboveground Petroleum Storage Spill Prevention Control and Countermeasures • Hazardous Waste Generation and Onsite Treatment • Uniform Fire Code Plan and Inventory Requirements
	State Hazardous Waste and Substances List ("Cortese List"); DTSC, RWQCB, SC EHD.	The oversight of hazardous materials sites often involves several different agencies that may have overlapping authority and jurisdiction. For the onsite hazardous materials cases and issues, the RWQCB is the lead agency. Other cases may be overseen by the DTSC, the RWQCB, Kern County, or other agencies.
Hazardous Waste Handling	California Hazardous Materials Release Response Plan and Inventory Law of 1985; CUPA	The California Hazardous Materials Release Response Plan and Inventory Law of 1985 (Business Plan Act) requires that businesses that store hazardous materials onsite prepare a Hazardous Materials Business Plan (HMBP) and submit it to the local CUPA, which in this case is the KCFD.
	California Hazardous Waste Control Act; DTSC	Under the California Hazardous Waste Control Act, *California Health and Safety Code*, Division 20, Chapter 6.5, Article 2, Section 25100, et seq., DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste in California. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. DTSC is also the administering agency for the California Hazardous Substance Account Act. *California Health and Safety Code*, Division 20, Chapter 6.8, Sections 25300 et seq., also known as the State Superfund law, providing for the investigation and remediation of hazardous substances pursuant to State law.
	California Fire Code	The California Fire Code regulates the storage and handling of hazardous materials, including the requirement for secondary containment, separation of incompatible materials, and preparation of spill response procedures.
Hazardous Materials Transportation	Titles 13, 22, and 26 of the California Code of Regulations	Regulates the transportation of hazardous waste originating in and passing through the state, including requirements for shipping, containers, and labeling.
	CHP and Caltrans	These two state agencies are primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies.

TABLE 3.9-2 (CONTINUED)
STATE LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible State Agency	Description
Workplace Safety	Cal/OSHA	Cal/OSHA has primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations (CFR). Cal/OSHA standards are generally more stringent than federal regulations.
	Cal/OSHA regulations (Title 8 CCR)	Concerning the use of hazardous materials in the workplace require employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.
Construction Storm Water General Permit (Construction General Permit; Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ)	RWQCB	Dischargers whose project disturbs one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one of more acres, are required to obtain coverage under the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). Construction activity subject to this permit includes clearing, grading, grubbing, and other disturbances to the ground such as excavation and stockpiling, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of a facility. The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific Best Management Practices (BMPs) designed to prevent sediment and pollutants from contacting stormwater from moving offsite into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area.
Underground Infrastructure	California Code of Regulations Sections 4216–4216.9	Sections 4216–4216.9 "Protection of Underground Infrastructure" requires an excavator to contact a regional notification center (e.g., Underground Services Alert or Dig Alert) at least two days prior to excavation of any subsurface installations. Any utility provider seeking to begin a project that could damage underground infrastructure can call Underground Service Alert, the regional notification center for southern California. Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the project. Representatives of the utilities are then notified and are required to mark the specific location of their facilities within the work area prior to the start of project activities in the area.

California Department of Pesticide Regulation – Restricted Materials Permits and Pesticide Use Report (PUR)

The California Department of Pesticide Regulation (CDPR) is dedicated to protect human health and the environment by regulating pesticide sales and use, and by fostering reduced-risk pest management. The State of California maintains a list of pesticides that are especially dangerous to human health or the environment if used incorrectly, commonly called restricted materials. These pesticides are listed in 3 CCR 6400. CDPR puts special controls and limitations on these

pesticides; furthermore, the purchase or use of restricted materials for agricultural purposes requires a permit from the County Agricultural Commissioner (CAC). Use requirements for these pesticides are given in 3 CCR 6445 through 6489.

CDPR maintains a list of registered pesticides known to cause groundwater contamination in California; these pesticides are listed in Title 3, *California Code of Regulations* (3 CCR), Section 6800(a). Section 6800(a) pesticides have certain use restrictions. Section 6800(a) pesticides are prohibited below the high water mark inside artificial recharge basins, unless the pesticide is applied six months or more before the basin is used to recharge groundwater (3 *CCR* Section 6487.1).

CDPR also maintains a list of pesticides that have the potential to move to, but are not currently found in groundwater, listed in 3 *CCR* 6800(b). Section 6800(b) pesticides are not prohibited for use in artificial recharge basins (CDPR 2020a).

CDPR also has regulations pertaining to wellhead protection and the use of pesticides, as listed in 3 CCR 6609 (CDPR 2020a). These measures apply to all wells (irrigation, domestic, municipal, monitoring, abandoned, dry, or drainage wells) where pesticides are mixed, loaded, rinsed, or otherwise used within 100 feet of the well. The following management measures are given by CDPR to protect wellheads:

- Wells protected from runoff:
  - The well should be sited so that no surface water runoff can contact the wellhead including the concrete base, or;
  - A berm should be constructed adjacent to the wellhead to prevent movement of surface water to the wellhead. Pre-emergent herbicides from the 6800(a) and 6800 (b) lists are prohibited between the berm and the wellhead.
- Wells not protected from runoff: The following activities are prohibited within 100 feet of an unprotected well:
  - Mixing, loading, and storing pesticides,
  - Rinsing of spray equipment or pesticide containers,
  - Maintenance of spray equipment that could result in a pesticide or pesticide residue spill,
  - Application of pre-emergent herbicides from the 6800(a) and 6800 (b) lists.

California became the first state to require full reporting of agricultural pesticide use in response to demands for more realistic and comprehensive pesticide use data. Under the PUR program, all agricultural pesticide use must be reported monthly to county agricultural commissioners, who in turn, report the data to CDPR.

Local

Kern County General Plan

The goals, policies, and implementation measures in the Kern County General Plan for hazards and hazardous materials applicable to the project are found in the Circulation Element and Safety

Element. The Circulation Element describes transportation-related accidents and spills of hazardous materials as serious threat to the traveling public and nearby sensitive land uses (County of Kern 2009a). The Safety Element presents general polices and implementation measures to ensure safety precautions are followed and conformance with applicable plans and codes (County of Kern 2009b).

Metropolitan Bakersfield General Plan

The Metropolitan Bakersfield General Plan Safety Element identifies issues, goals, policies, and implementation measures to protect the community from unreasonable risks. The Safety Element is divided into three sections which address seismic safety, flooding and public safety, as well as general provisions (County of Kern 2007).

Kern County Operational Area Hazardous Materials Area Plan

The Hazardous Materials Area Plan (HMAP) provides policy direction and action programs to address current and future hazardous waste management issues that require local responsibility and involvement in Kern County. In addition, the HMAP discusses hazardous waste issues and analyzes current and future waste generation in the incorporated cities, county, and State and federal lands. The purpose of the HMAP is to coordinate local implementation of a regional action to effect comprehensive hazardous waste management throughout Kern County. The HMAP focuses on development of programs to equitably site needed hazardous waste management facilities; to promote on-site source reduction, treatment, and recycling; and to provide for the collection and treatment of hazardous waste from small-quantity generators. An important component of the HMAP is the monitoring of hazardous waste management facilities to ensure compliance with federal and State hazardous waste regulations (County of Kern 2014).

Kern County Department of Agriculture and Measurement Standards

As previously discussed, the CDPR regulates the use of pesticides at the State level. The Kern County Department of Agriculture and Measurement Standards implements and regulates those regulations at the local level through the CAC. The purchase or use of restricted materials for agricultural purposes requires a permit from the CAC. The permit application must list the types of restricted materials to be used, the areas to be treated, their location and size, crops to which the pesticide will be applied, pest problems, and the type of pesticide application method. Surrounding areas that could be harmed by pesticide application must also be described or shown on a map. The CAC reviews the permit to decide if pesticide application will have an impact on human health or the surrounding environment; if the CAC believes harm may be likely, he or she can request the applicant to evaluate pesticide alternatives or impose extra controls (i.e. permit conditions) in addition to those already on the pesticide label or in regulations. If the CAC determines a pesticide cannot be used safely, he or she may deny the permit (CDPR 2020b).

Restricted materials permits are generally issued for one year, and require applicants to notify the CAC 24 hours prior to the scheduled pesticide application each time they plan to apply a restricted material. The CAC may inspect a site if he or she deems it necessary. The CAC may determine for that area that a non-restricted pesticide may present a hazard to human health or the environment; the CAC can require an agricultural operator to get a permit for pesticide use in that

area. The determination for requiring a permit for a non-restricted use permit is a lengthy process, which may involve local officials and requires public notice. If a pesticide is not on the restricted materials list (3 CCR 6400), a farmer does not need a permit to apply it unless a local permit is required (CDPR, 2020b).

Kern County Fire Department Fire Hazard Reduction Program

The Kern County Fire Hazard Reduction Program (FHRP) is a joint effort between the Kern County Fire Department, CAL FIRE, Kern County Code Enforcement, and property owners to ensure fire safe communities within the County. The program is currently administered and enforced by KCFD personnel to enforce Kern County Ordinance Code 8.46 in accordance with other state and federal guidelines. The goal is to provide sufficient defensible space around homes and other structures to improve the safety of the public and emergency personnel. Heavy accumulations of fuel and/or dry fuel poses a significant risk to property, neighboring properties, and fire personnel. Inspections are typically done once a year after June 1 in preparation for the fire season. Property owners are expected to keep their properties clear of fire hazards year round (KCFD 2020b).

Property owners are expected to maintain their property free of fire hazards and accumulated vegetation growth throughout the year. June 1 is the deadline for completion of this clearance prior to annual inspections. All structures on the property, regardless of construction type or use, are required to have a minimum of 30 feet of clearance and 100 feet of fuel reduction, or to the property line if closer. Any vegetation within these zones should be green, ornamental trees, grass and shrubs only, and should be spaced out and have sufficient ground clearance to discourage fire spread. For vacant properties with no structures, the requirement is to provide a minimum 10-foot fuel break along all property lines that lie within 100 feet of any structures on neighboring properties (KCFD 2020b). In addition, property owners are required to remove accumulation of combustible fuels that can be deemed a fire hazard (KCFD 2020b).

3.9.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to hazards and hazardous materials. The proposed project would have a significant impact if it would:

1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
2. 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.
3. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
4. 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.

5. 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.
6. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
7. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires.
8. Cause an increase in airborne insect populations.
9. Result in cumulatively considerable impacts to hazards and hazardous materials.

Methodology

Information for this assessment of impacts relative to hazards and hazardous materials is based on a review of literature research (e.g., fire severity zone maps provided by CAL FIRE), the DTSC EnviroStor database, SWRCB's GeoTracker database, the Cortese List, and the General Plans for the County of Kern and the City of Bakersfield (Metropolitan Bakersfield). This information was used to identify potential impacts to workers, the public, or the environment.

The project would be regulated by the various laws, regulations, and policies summarized in Section 3.9.2, *Regulatory Framework*. Compliance by the project with applicable federal, State, and local laws and regulations is assumed in this analysis, and local and State agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations is a condition of permit approval.

A significant impact would occur if, after considering the features described in Chapter 2, *Project Description*, and the required compliance with regulatory requirements, an impact would still occur. For those impacts considered to be potentially significant, mitigation measures are proposed to reduce the identified impacts.

Impact Analysis

Hazardous Materials

Impact 3.9-1: The proposed project could create a significant hazard to the public or the environment through the routine transport, use, disposal, or the accidental release of hazardous materials. (*Less than Significant Impact with Mitigation*)

Construction

During potential demolition and new construction phases, construction equipment and materials may include fuels, oils and lubricants, solvents and cleaners, cements and adhesives, paints and thinners, degreasers, cement and concrete, and asphalt mixtures, which are all commonly used in construction. The routine use or an accidental spill of hazardous materials could result in inadvertent releases, which could adversely affect construction workers, the public, and the environment, resulting in a potentially significant impact.

Construction activities would be required to comply with numerous hazardous materials regulations designed to ensure that hazardous materials are transported, used, stored, and disposed of in a safe

manner to protect worker safety, and to reduce the potential for a release of construction-related fuels or other hazardous materials into the environment. Contractors would be required to prepare and implement Hazardous Materials Business Plans (HMBPs) that would require that hazardous materials used for construction would be used properly and stored in appropriate containers with secondary containment to contain a potential release. The California Fire Code would also require measures for the safe storage and handling of hazardous materials.

As discussed in Section 3.7, *Geology and Soils*, construction contractors would be required to prepare a Stormwater Pollution Prevention Plan (SWPPP) for construction activities according to the National Pollutant Discharge Elimination System (NPDES) General Construction Permit requirements. The SWPPP would list the hazardous materials (including petroleum products) proposed for use during construction; describe spill prevention measures, equipment inspections, equipment and fuel storage; protocols for responding immediately to spills; and describe BMPs for controlling site runoff.

In addition, the transportation of hazardous materials would be regulated by the USDOT, Caltrans, and the CHP. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release.

Workers handling hazardous materials are required to adhere to OSHA and Cal/OSHA health and safety requirements. Hazardous materials must be transported to and from the proposed project area in accordance with RCRA and USDOT regulations, managed in accordance with the OCEHD regulations, and disposed of in accordance with RCRA and the CCR at a facility that is permitted to accept the waste. Since compliance with existing hazardous materials regulations and programs are mandatory, project construction activities are not expected to create a potentially significant hazard to construction workers, the public, or the environment.

Furthermore, in the event of a spill that releases hazardous materials at the project site, a coordinated response would occur at the federal, State, and local levels, including the KCFD, which is the local hazardous materials response team. In the event of a hazardous materials spill, the KCFD and local police department would be simultaneously notified and sent to the scene to assess and respond to the situation.

As discussed in Section 3.9.1, *Environmental Setting*, past studies of portions of the project area indicated no residual agricultural chemicals at concentrations above regulatory standards. However, the proposed project includes an area larger than the specific sites that were studied before. Facilities can be implemented anywhere within the Phase 1, Phase 2, or Kern Fan Conveyance Facility areas, which all have a historical use of agricultural production. This past agricultural land use may have resulted in contaminated soils due to the presence of persistent agricultural chemical residues from herbicide and pesticide applications. As a result, construction workers could be exposed to such contaminated soils, and hazardous chemicals could be introduced to groundwater during recharge operations. Construction of the recharge basins would involve scraping/excavating surface soils to create berms, such that the recharge basin floors are below grade. Any residual pesticides in the surface soils of the former agricultural areas would be

scraped off the recharge basin floor. The potential for residual pesticides to be transported to the groundwater by the recharge water is minimal since the surface soils would be scrapped from the basin floors.

Nonetheless, implementation of **Mitigation Measure HAZ-1** would require that samples of soils onsite are analyzed and appropriately remediated or removed if soils contain hazardous quantities of contaminants. This would reduce any potential impacts to construction workers due to encounters with hazardous materials to less than significant levels and reduce impacts to groundwater due to potential transport of hazardous substances during recharge activities.

In addition, as with many former agricultural properties, it is possible that irrigation lines on the property may contain asbestos or be wrapped in asbestos. If these irrigation lines are reused or demolished, asbestos materials may pose an adverse impact to the workers and the environment. If asbestos-containing materials are uncovered during construction, **Mitigation Measure HAZ-2** would require all work at the project sites to halt so that a proper assessment can be made and proper worker protection measures can be implemented. Implementation of Mitigation Measures HAZ-1 and HAZ-2 would reduce impacts related to accidental upset or encounter of hazardous materials to less than significant levels.

According to CalGEM, approximately 6 active oil and well fields are located within the Phase 1 area. Although the specific proposed recharge and recovery sites have not yet been determined, there is potential for the project facilities to be located within agricultural lands. In the event that facilities would be located on a site that contains an active oilfield, impacts to the environment resulting from spillage, releases, and disposal of oil associated with oilfield production and storage may have occurred in the past or could occur during construction. Active wells could have also released hazardous materials that migrated beyond the boundaries of the oilfield within the project area. This could potentially expose construction workers to potential hazardous substances or introduce hazardous substances to groundwater during recharge operations.

Mitigation Measure HAZ-3 would require the completion of a Phase I ESA to ensure hazards and appropriate mitigation measures are identified within the project sites prior to construction. Implementation of these mitigation measures would reduce potential impacts to a less than significant level.

The required compliance with the numerous laws and regulations discussed above that govern the transportation, use, handling, and disposal of hazardous materials during construction of the proposed project would limit the potential for creation of hazardous conditions due to the routine use or accidental release of hazardous materials. Furthermore, implementation of Mitigation Measure HAZ-1 through HAZ-3 would reduce potential impacts to the public and the environment to less than significant levels.

Operation

Operation and maintenance activities at the recharge and recovery facilities' and Kern Fan Conveyance Facilities areas' facilities would require weed and pest control operations, as necessary. Periodic earthwork operations would also be required to maintain levees, enhance soil

permeability, and remove vegetative growth. Maintenance activities and periodic earth work outside of normal operations would also be subject to regulations for the safe handling, transportation, and disposal that would include appropriate containerization and labeling, transportation by licensed hazardous materials haulers, and disposal at licensed facilities permitted to accept the waste.

In addition, conventional agricultural practices would be allowed within the project area during interim periods when the recharge basins are not used for active recharge operations. Conventional farming would be in compliance with all applicable regulatory requirements of the USEPA, CDPR, and the Kern CAC. Farming operations could include the use of restricted or unrestricted materials, including pesticides that are listed in 3 *CCR* Section 6800(a) and/or 6800(b). The Authority would require all contract farmers to comply with regulations pertaining to application of pesticides within recharge basins and in proximity to wellheads. In accordance with *CDPR* regulations, Section 6800(a) pesticides would be restricted from application below the high water mark inside the recharge basins, unless the pesticide is applied six months or more before the basin is used for groundwater recharge. Section 6800(b) pesticides could be used within the recharge basins without restriction, also in accordance with CDPR regulations. All required measures pertaining to wellhead protection also would be implemented, such as prohibiting mixing, loading, spraying, storage or pesticides within 100 feet of an unprotected wellhead, and prohibiting application of pre-emergent herbicides from the 6800(a) and 6800(b) lists between the berm and the wellhead of a protected wellhead.

The Authority would require the contract farmer to obtain a permit from the CAC for application of restricted materials and to comply with all conditions of the permit in order to ensure the protection of human health and the environment. The contract farmer also would be required to notify the CAC 24 hours prior to application of any restricted materials on the Stockdale Properties. The contract farmer would be required to inform the Authority and the CAC in the event of any accidental spill or inappropriate application of pesticides onsite. The contract farmer would be required to remediate completely and dispose of properly all contaminated soil to prevent the transport of pesticides into the groundwater and protect public health.

The required compliance with the numerous laws and regulations discussed above that govern the transportation, use, handling, and disposal of hazardous materials during operation of the proposed project and maintenance activities would limit the potential for creation of hazardous conditions due to the routine use or accidental release of hazardous materials. The impact to the public and the environment would be less than significant.

Mitigation Measures

HAZ-1: Prior to initiating ground disturbance and construction activities, for project facilities located on lands previously used for active agriculture production, the Authority shall collect representative samples of soils to be analyzed for total petroleum hydrocarbons and pesticides. The Authority shall avoid if feasible or otherwise remove from the site soils identified as containing hazardous quantities of contaminants and dispose of such soils in accordance with applicable hazardous waste regulations.

HAZ-2: In the event that asbestos-containing materials are uncovered during project construction, work at the project sites shall immediately halt and a qualified hazardous materials professional shall be contacted and brought to the project sites to make a proper assessment of the suspect materials. All potentially friable asbestos-containing materials shall be removed in accordance with federal, State, and local laws and the National Emissions Standards for Hazardous Air Pollutants guidelines prior to ground disturbance that may disturb such materials. All demolition activities shall be undertaken in accordance with California Occupational Safety and Health Administration standards, as contained in Title 8 of the *CCR*, Section 1529, to protect workers from exposure to asbestos. Materials containing more than one percent asbestos shall also be subject to San Joaquin Valley Air Pollution Control District regulations. Demolition shall be performed in conformance with federal, State, and local laws and regulations so that construction workers and/or the public avoid significant exposure to asbestos-containing materials.

HAZ-3: A Phase I Environmental Site Assessment shall be prepared for the project sites to identify potential hazards and hazardous materials located within a one-mile radius. The construction contractor shall be informed of potential hazards and shall develop appropriate plans to avoid or remediate hazards.

Significance Determination

Less than Significant Impact with Mitigation

Hazardous Materials near Schools

Impact 3.9-2: The proposed project could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. (*Less than Significant Impact with Mitigation*)

Construction

Construction of the proposed project would require the short-term use of various hazardous materials, as discussed above in Impact 3.9-1. The transport of the hazardous materials could use haul routes that pass by schools, particularly Del Rio Elementary School and Bakersfield Christian High School.

During construction activities within the project area, construction equipment and materials may include fuels, oils and lubricants, solvents and cleaners, cements and adhesives, paints and thinners, degreasers, cement and concrete, and asphalt mixtures, which are all commonly used in construction. The construction materials, which are not considered acutely hazardous, would be transported, used, and disposed of during construction. The routine use or an accidental spill of hazardous materials could result in inadvertent releases in proximity to nearby schools, which could adversely affect students, staff, and the general public.

As described above under Impact 3.9-1, construction activities would be required to comply with numerous hazardous materials regulations designed to ensure that hazardous materials are transported, used, stored, and disposed of in a safe manner to protect worker safety, and to reduce the potential for a release of construction-related fuels or other hazardous materials into the environment, including in proximity to schools. The required compliance with the numerous laws

and regulations discussed above that govern the transportation, use, handling, and disposal of hazardous materials during construction of the proposed project would minimize the potential risks associated with hazardous materials within one-quarter mile of a school. Nonetheless, for project facilities that will be constructed within one-quarter mile of a school, implementation of **Mitigation Measure HAZ-4** would require coordination with the Rio Bravo-Greeley Union School District and any affected schools to determine a haul route that would not impact existing school safety routes. Implementation of the Mitigation Measure HAZ-4 would ensure impacts to the school facilities during construction are reduced to less than significant levels.

Operation

The operation of the project may result in the routine use and transport of some hazardous materials associated with agricultural production. As described above under Impact 3.9-1, the use of hazardous chemicals would be regulated under various regulations, that would be required for the operation and maintenance of the proposed facilities. In addition, the chemicals would be stored within containers that are themselves within secondary containment. The required compliance with the numerous laws and regulations discussed above that govern the transportation, use, handling, and disposal of hazardous materials during operation of the proposed project would reduce the impact to schools within one-quarter mile of the project site to less than significant.

Mitigation Measures

> **HAZ-4**: Prior to construction of project facilities located within one-quarter mile of a school, the contractors shall coordinate the proposed construction haul route with the impacted school district and school facility to avoid school safety routes.

Significance Determination

Less than Significant Impact with Mitigation

Hazardous Material Site Listing

Impact 3.9-3: The proposed project could 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, could create a significant hazard to the public or the environment. (*Less than Significant Impact with Mitigation*)

Construction and Operation

GeoTracker and EnviroStor database searches identified one Cleanup Program Site and one Land Disposal Site within the project area (refer to Figure 3.9-1).[3] As described above in Section 3.9.1, *Environmental Setting*, the Continental Carbon Company Cleanup Program Site's potential contaminant of concern is asbestos that may have contaminated underlying soils via wastewater ponds near the site. The Cleanup Program Site has been inactive by the SWRCB since 1987, however, DTSC continues to have this site listed as an ongoing investigation after DTSC became

[3] The GeoTracker and EnviroStor databases are part of the Cortese list.

responsible for the site in 2010. The Stockdale landfill site's contaminant of concern was not identified; however, there has been work in the area to remove carbon black from the site.

USEPA concluded that contamination of groundwater near the Continental Carbon Company site was not a major concern due to the immobility and insolubility of the particulates left in the soil. Nonetheless, as the site is still under review by the DTSC, there is a potential for the site and surrounding area to have contaminated soils, which could create a significant hazard to the public or environment. Similarly, the Stockdale landfill site is still active and could require more cleanup efforts.

Implementation of Mitigation Measures HAZ-1 and HAZ-3 would require preparation of a Phase I Environmental Site Assessment for the project sites once they are identified, and would require that samples of soils taken from the project sites are analyzed and appropriately remediated or removed if soils contain hazardous quantities of contaminants. This would reduce any potential impacts to construction workers due to encounters with hazardous materials to less than significant levels and reduce impacts to groundwater due to potential transport of hazardous substances during recharge activities. Implementation of these mitigation measures would reduce impacts related to hazardous material sites to a less than significant level.

Mitigation Measures

Implement Mitigation Measures HAZ-1 and HAZ-3.

Significance Determination

Less than Significant Impact with Mitigation

Safety Hazards Near Airport

Impact 3.9-4: The proposed project is not 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; the proposed project would not result in a safety hazard or excessive noise for people residing or working in the project area. (*No Impact*)

Construction and Operation

The project area is outside of the ALUCP planning areas in Kern County. Therefore, the proposed project construction and operation would not result in an airport-related safety hazard or airport-related noise for people residing or working in the area. There would be no impact.

Mitigation Measures

None Required

Significance Determination

No Impact

Emergency Response Plan

Impact 3.9-5: The proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (*Less than Significant Impact with Mitigation*)

Construction

As described above in Section 3.9.1, *Environmental Setting*, the KCFD EOC maintains the EOP for the area which includes information for the public about what to do if an emergency or disaster were to occur. The EOP does not identify any specific evacuation areas or routes within the project area; therefore, construction activities within the project area would not interfere with an emergency evacuation plan.

However, as explained in Section 3.14, *Transportation*, construction of the proposed Kern Fan Conveyance Facilities would require tunneling under Interstate 5 (I-5) so that water may be transferred to/from the Kern Fan Project Properties to the California Aqueduct, which may require short-term lane or road closures or detours. Potential road closures or detours could congest local roadways that could be used by the public and emergency responders if an emergency or disaster were to occur. To ensure that impacts to local rights-of-way do not occur as a result of the proposed project, implementation of **Mitigation Measure TRA-1** would require the preparation and implementation of a Construction Traffic Control Plan. The Construction Traffic Control Plan would include, but not be limited to, signage, striping, delineated detours, flagging operations, changeable message signs, delineators, arrow boards, and K-Rails that would be used during construction to guide motorists, bicyclists, and pedestrians safely through the construction area and allow for adequate emergency access and circulation to the satisfaction of the KCFD. The Construction Traffic Control Plan would be coordinated with the City of Bakersfield, as necessary, as well as with emergency responders, which include fire departments, police departments, and ambulances that have jurisdiction within the proposed project area. Therefore, with implementation of Mitigation Measure TRA-1, impacts to circulation system within the project area during construction of the proposed project would be reduced to a less than significant level, and project construction would not impair or physically interfere with emergency response teams or an evacuation plan. Impacts would be less than significant.

Operation

Operation and maintenance activities for the proposed project would be substantially similar to current conditions respective to emergency response and evacuation. No operation-related activities would occur within surrounding rights-of-ways that could impair or physically interfere with an adopted emergency response plan or emergency evacuation plan. As a result, no impact would occur.

Mitigation Measures

Implement Mitigation Measure TRA-1 during project construction (see Section 3.14, *Transportation*, for details).

Significance Determination

Less than Significant Impact with Mitigation

Wildland Fires

Impact 3.9-6: The proposed project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires. (*Less than Significant Impact*)

Construction

As discussed in Section 3.9.1, *Environmental Setting*, the project area is located within both SRA and LRA areas with a majority of areas within no FHSZ zones. The project area also contains some Moderate FHSZs and is located near one High FHSZ. As discussed in Impact 3.17-2 in Section 3.17, *Wildfire*, the primary fire hazards from project construction would involve the use of vehicles and equipment. Heat or sparks from construction vehicles and equipment could ignite dry vegetation and cause a fire, particularly during the dry, hot conditions from June to September and from September to December when dry winds are more likely to occur. Additionally, construction activities that could result in sparks have a greater likelihood of creating a source of ignition. Therefore, depending on the time of year (as seasonality may affect climate conditions, prevailing winds, and vegetation/fuels) and the location of construction activities, the increase in sources of potential ignition associated with project construction could exacerbate the risk of wildfire at a project site and in surrounding areas. Project construction could increase the risk of exposure of people or structures to significant loss, injury, or death involving wildland fires, which would result in a potentially significant impact.

As explained for Impact 3.17-2 in Section 3.17, *Wildfire*, all personnel on a project site would have to comply with *PRC* Sections 4427, 4428, 4431, and 4442, which include regulations relating to the handling of combustible fuels and equipment that can exacerbate fire risks. During construction, strict adherence to these PRC sections would ensure that contractors are responsible for all monitoring and safety measures ensuring that any risk to exacerbate wildfire would be reduced. Additionally, all construction must comply with fire protection and prevention requirements specified by the CCR and Cal/OSHA. This includes various measures such as easy accessibility of firefighting equipment, proper storage of combustible liquids, no smoking in service and refueling areas, spark arrestors on equipment, and worker training for firefighter extinguisher use. Implementation of all relevant PRC sections, and requirements specified by the CCR and Cal/OSHA would ensure that potential impacts regarding wildland fires would be less than significant.

Operation

The proposed recharge, recovery and Kern Fan Conveyance Facilities would require periodic maintenance similar to existing conditions within the project area. Operation-related activities would involve a limited number of maintenance trucks for inspections and material delivery. These trucks would be limited to established access roads and would have a low potential of producing sparks, fire, or flame, that could result in uncontrolled spread of wildfire. Nevertheless,

due to some moderate wildfire risk, operators of the proposed facilities would comply with *PRC* Sections 4427, 4428, 4431, and 4442, which include regulations relating to the handling of combustible fuels and equipment that can exacerbate fire risks.

Operation of the proposed project would not include any activities that would exacerbate wildfire risk relative to existing conditions. The proposed project would involve the implementation of new recharge basins, which would result in increased water storage capacity and water levels within those areas. This would effectively create more inundated areas less susceptible to catching fire. The reduction of flammable surface area within the Moderate FHSZs could prevent or reduce uncontrolled spread of wildfire. When the recharge basins act as agricultural land, the surface area susceptible to wildfire risk would increase. However, the agricultural fields would be irrigated, reducing the risk of wildfire. Proposed Kern Fan Conveyance Facilities consist pump stations, pipelines and/or canals. Canals would be inundated similar to recharge basins, pipelines would be underground, and pump stations would not be designed with flammable materials. Similar to pump stations, recovery wells would not involve operations or be made of building materials susceptible to ignition. Therefore, there would be a less than significant impact due to wildland fires during operation of the proposed project.

Mitigation Measure

None Required

Significance Determination

Less than Significant Impact

Vector Control

Impact 3.9-7: The proposed project operation could cause an increase in airborne insect populations. (*Less than Significant Impact with Mitigation*)

The proposed recharge facilities within the project area would create new standing pools of water. If algae growth develops or insects such as midges or mosquitoes use the water as a breeding area, any standing pools of water could be considered a nuisance or a health threat to the surrounding community. Hatching midges can emerge in such tremendous numbers that they create nuisance problems. Midges often emerge simultaneously forming vast clouds of flying insects. They are especially attracted to lights. Large clouds of insects could form over local roadways creating a traffic hazard.

West Nile Virus, a disease transmitted by mosquitoes, has been detected in Kern County with approximately 32 human cases in 2019 and 0 human cases as of October 2020 (Kern County Public Health Services Department 2020). The Kern County Department of Public Health Services has provided residents with tips for avoiding the West Nile Virus. The proposed project could contribute to a public health hazard if the standing water in the recharge basins contributed to an increase in the mosquito population in the project area.

However, the implementation of **Mitigation Measure HAZ-5** would require coordination with the Kern County Department of Public Health Services and the Kern Mosquito and Vector Control District to ensure development of appropriate insect control measures that utilize abatement methods appropriate for recharge basins, such that groundwater quality is protected. Mitigation Measure HAZ-5 would minimize the potential effects associated with airborne insect populations by minimizing population increases. Impacts would be less than significant with mitigation.

Mitigation Measures

> **HAZ-5:** The Authority shall coordinate with the Kern County Department of Public Health Services and the Kern Mosquito and Vector Control District prior to project operations to develop and implement, if necessary, appropriate insect abatement methods. Such methods shall not utilize any substances that may contaminate groundwater or be harmful to wildlife.

Significance Determination

Less than Significant Impact with Mitigation

Cumulative Impacts

Impact 3.9-8: The proposed project could result in cumulatively considerable impacts to hazards and hazardous materials. (*Less than Significant Impact with Mitigation*)

This section presents an analysis of the cumulative effects of the proposed project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts relative to hazards and hazardous materials. As previously discussed, the proposed project would have no impact with respect to being located within two miles of an airport. Accordingly, the proposed project could not contribute to cumulative impacts related to this topic and is not discussed further.

The geographic area affected by the proposed project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative hazardous materials impacts encompasses and is limited to the future project sites and their immediately adjacent area. This is because impacts relative to hazardous materials are generally site-specific and depend on the nature and extent of the hazardous materials release, and existing and future soil and groundwater conditions. For example, hazardous materials incidents tend to be limited to a smaller more localized area surrounding the immediate spill location and extent of the release, and could only be cumulative if two or more hazardous materials releases spatially overlapped.

The timeframe during which the proposed project could contribute to cumulative hazards and hazardous materials effects includes both the construction and operations phases. For the proposed project, the operational phases are permanent. However, similar to the geographic limitations discussed above, it should be noted that impacts relative to hazardous materials are generally time-

specific. Hazardous materials events could only be cumulative if two or more hazardous materials releases occurred at the same time, as well as overlapping at the same location.

Significant cumulative impacts related to hazards and hazardous materials could occur if the incremental impacts of the project combined with the incremental impacts of one or more cumulative projects identified in Table 3-2 of this Draft EIR substantially increase risk that people or the environment would be exposed to hazards and hazardous materials. The cumulative projects that could be geographically adjacent or overlap components of the proposed project are shown on Figure 3-1. The cumulative projects are projects that either involve road improvements and extensions or projects similar to the proposed project, which include recharge, recovery, and conveyance facilities within the Rosedale service area.

Construction

Cumulative projects would be subject to the same regulatory requirements discussed for the project, including the implementation of HMBPs and compliance with existing regulations for the transport, use, storage, and disposal of hazardous materials. That is, cumulative projects involving releases of or encountering hazardous materials also would be required to manage their hazardous materials to the same established regulatory standards and, in the case of spills or accidents, remediate their respective sites to the same established regulatory standards.

This would be the case regardless of the number, frequency, or size of the release(s), or the residual amount of chemicals present in the soil from previous spills. While it is possible that the project and cumulative projects could result in releases of hazardous materials at the same time and in overlapping locations, the responsible party associated with each spill would be required to remediate site conditions to the same established regulatory standards. Further, implementation of Mitigation Measures HAZ-1 through HAZ-3 would require that samples of soils on various project sites are analyzed and appropriately remediated or removed if soils contain hazardous quantities of contaminants. This would reduce any potential impacts to construction workers due to encounters with hazardous materials to less than significant levels and reduce impacts to groundwater due to potential transport of hazardous substances during recharge activities. The residual less-than-significant effects of the project that would remain after remediation would not combine with the potential residual effects of cumulative projects to cause a potential significant cumulative impact because residual impacts would be highly site-specific. Accordingly, no significant cumulative impact with respect to the use or release of hazardous materials would result. For the above reasons, the combined effects of the construction of the project in combination with cumulative projects would not have a cumulatively considerable contribution to a cumulative impact relative to the use of hazardous materials.

The construction of cumulative projects could involve hazardous materials within one-quarter mile from a school. Similar to the proposed project's Mitigation Measure HAZ-1, cumulative projects near schools should coordinate with the local school district and specific schools in order to avoid locations and routes near school facilities. This would reduce any potential impacts to schools to less than significant. Implementation of this mitigation measure would reduce the cumulatively considerable contribution to a cumulative impact relative to hazardous material use within one-quarter mile of schools.

The construction of cumulative projects could potentially expose workers, structures, and the public to contaminated soils located on hazardous materials sites. Similar to Mitigation Measure HAZ-1 through HAZ-3 of the proposed project, cumulative projects would be required to sample of soils onsite appropriately remediated or removed if soils contain hazardous quantities of contaminants. This would reduce any potential impacts to construction workers due to encounters with hazardous materials to less than significant levels and reduce impacts to groundwater due to potential transport of hazardous substances during recharge activities. Implementation of this mitigation measure would reduce the cumulatively considerable contribution to a cumulative impact relative to hazardous material sites.

The construction of the cumulative projects could require the temporary closure of traffic lanes, which could impact emergency access. Similar to the proposed project, other cumulative construction projects would be required to provide appropriate traffic control and emergency access for their projects similar to Mitigation Measure TRA-1. Implementation of traffic control plans would reduce the cumulatively considerable contribution to a cumulative impact relative to emergency access.

Finally, cumulative projects in areas susceptible to wildfires would also be required to implement wildfire prevention measures to prevent wildfire. For the above reasons, the combined effects of the project and cumulative projects would not result in a cumulatively considerable effect, and impacts would be less than significant.

Operations

Similar to the proposed project, the cumulative projects' activities involve the handling, storage, and disposal of hazardous materials, and would be required to prepare and implement an HMBP and comply with applicable regulations, including those governing the use, storage, transportation, and disposal of hazardous materials, including emergency response and notification procedures in the event of a spill or release. Specifically, the use of pesticides for cumulative projects involving recharge basins, would be required to comply with regulations enforced by the CDPR, which regulates the sale, use, and disposal of pesticides within California. Transportation and disposal of wastes would also be subject to regulations for the safe handling, transportation, and disposal of chemicals and wastes. As noted previously, such regulations include standards to which parties responsible for hazardous materials releases must return spill sites, regardless of location, frequency, or size of release, or existing background contaminant concentrations to their original conditions. Compliance with existing regulations regarding hazardous materials use would reduce the risk of environmental or human exposure to such materials would reduce the cumulatively considerable contribution to a cumulative impact relative to hazardous materials.

Cumulative projects in areas susceptible to wildfires would also be required to implement wildfire prevention measures to prevent wildfire. With compliance with existing regulations, the combined effects of the project and cumulative projects would not result in a cumulatively considerable effect, and impacts would be less than significant relative to wildfires. Lastly, cumulative projects that include recharge facilities similar to the proposed project could result in an increase in airborne insect populations. Similar to the proposed project, cumulative projects

should coordinate with the Kern County Department of Public Health Services and the Kern Mosquito and Vector Control District. Potential cumulative impacts regarding vectors would be considered less than cumulatively considerable with the implementation of best practices for insect abatement that would result due to implementation of Mitigation Measure HAZ-5. Impacts would be less than significant with mitigation.

Mitigation Measures

Implement Mitigation Measures HAZ-1 through HAZ-5.

Implement Mitigation Measure TRA-1 (see Section 3.14, *Transportation*, for details).

Significance Determination

Less than Significant Impact with Mitigation

3.9.4 References

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3.10 Hydrology and Water Quality

This section addresses the hydrology and water quality impacts associated with construction and operation of the proposed project. This section includes: a description of the existing hydrology and water quality conditions in and around the project area; a summary of applicable regulations related to hydrology and water quality; and an evaluation of the potential impacts of the proposed project related to the hydrology and water quality conditions in and around the project area, including cumulative impacts.

To inform the project design and analysis of project impacts, the investigations listed below have been conducted to investigate site conditions, identify potential issues, and provide recommendations to address those issues. The information provided in the listed reports are the primary source of information for this section.

- Thomas Harder & Co. (THC), 2015. *Draft Proposed Stockdale Integrated Banking Project – Analysis of Potential Groundwater Level Changes from Recharge and Recovery at the Stockdale West and Stockdale East Facilities*. Prepared for Rosedale-Rio Bravo Water Storage District and Irvine Ranch Water District. January 23.
- Thomas Harder & Co. (THC), 2018. *Public Benefit Ratio Appeal of Water Storage Investment Program Public Benefit Ratio Review for the Kern Fan Groundwater Storage Project*. February 23.
- Thomas Harder & Co. (THC), 2019. *Draft Technical Memorandum, Rosedale-Rio Bravo Management Area Groundwater Sustainability Plan*. May 31.
- Thomas Harder & Co. (THC), 2020b. *Technical Memorandum, Kern Fan Groundwater Storage Project, Hydrogeological Analysis*, October 12.
- Rosedale-Rio Bravo Water Storage District (Rosedale), 2019, *Groundwater Sustainability Plan Chapter for the Rosedale-Rio Bravo Management Area*. December 10.
- Rosedale-Rio Bravo Water Storage District (Rosedale), 2020, *Groundwater Sustainability Plan Chapter for the Rosedale-Rio Bravo Management Area, Annual Report 2018-2019*. April 1.
- Irvine Ranch Water District and Rosedale-Rio Bravo Water Storage District (IRWD & Rosedale), 2020. *Kern Fan Groundwater Storage Project Feasibility Report*. Updated April 13.

3.10.1 Environmental Setting

Regional Setting

Climate

The project area is located in the southern portion of the Central Valley within the San Joaquin Valley. Climate in this area is characterized as arid to semi-arid with average annual precipitation of about six to seven inches per year (Rosedale 2019). Historical annual precipitation at the Bakersfield Airport Precipitation Station, located approximately five miles east of the eastern border of the Phase 1 area has ranged from 1.87 inches in 1959 to 13.32 inches in 1998. More

than half of the annual rainfall occurs between December and February with scattered shower activity during the other nine months. Average annual reference evapotranspiration (ETo) in the project area is relatively high with an average annual ETo at the Shafter CIMIS station located approximately nine miles north of project area of 57.06 inches.

Regional Topography

San Joaquin Valley makes up the southern two-thirds of the Central Valley, which stretches across the central spine of California. San Joaquin Valley is generally characterized by a relatively flat topography associated with the wide valley floor. The valley is comprised of large coalescing alluvial fans that have developed along each side of the valley. The larger and more gently sloping fans on the east side consist of deposits eroded and carried down from the granitic Sierra Nevada Mountains; whereas, the smaller and more steeply sloping fans on the west side are built up by sediments originating from marine sedimentary rocks of the Coast Range Temblor mountains. As a result, the valley floor consists mainly of two different kinds of alluvial materials that are derived from opposite sides of the basin and have different physical and geological properties. The project area is located along the Kern River Fan, which is comprised of unconsolidated sandy and silty sediments derived from weathered granitics from the Sierra Nevada Mountains.

Surface Water Hydrology

The San Joaquin River is the major drainage for the San Joaquin Valley; however, the southernmost portion of the valley is hydrologically separated from the San Joaquin River. This area of the valley is drained primarily by the Kern River. The Kern River originates on the eastern side of Tulare County west of Mount Whitney in the high Sierra Nevada Mountains. As it flows south through the Sierra Nevada, it emerges at Kernville into a widening valley before entering Lake Isabella, a reservoir formed on the river by the Isabella Dam. Downstream from the dam it flows southwest, through rugged canyons until emerging east of Bakersfield. Past Bakersfield, the river is highly diverted through a series of canals for agricultural and municipal water supply purposes. The Kern River Fan, referred to locally as the Kern Fan, covers an area of approximately 200 square miles and contains prolific subsurface water-bearing sedimentary deposits that make up the principal groundwater bearing units (Meillier 2001). The fan deposits are heterogeneous but consist primarily of sand and gravel deposits along with some finer grained deposits.

Surface Water Quality

As part of the requirements of the Clean Water Act, beneficial uses for surface waters must be identified in the Central Valley Regional Water Quality Control Board's (RWQCB) Water Quality Control Plan (Basin Plan) (RWQCB 2018). The project area is located within the Tulare Lake Basin, where the Kern River has a number of listed beneficial uses, including municipal supply, agricultural supply, industrial supply, industrial process, hydropower generation, contact and non-contact recreation; warm freshwater habitat; wildlife habitat; rare, threatened or endangered species; and groundwater recharge. Water quality management for the Kern River is based on these identified uses.

The Basin Plan sets water quality objectives that are qualitative and quantitative in order to protect those uses. The water quality parameters for the Kern River for which numerical limits were selected from the beneficial uses listed above are: total alkalinity, total mercury, dissolved iron, dissolved copper, dissolved zinc, dissolved arsenic, dissolved lead, chloride, and ammonia. However, in some cases the natural background level of a particular constituent is higher than the beneficial use protective numerical limit. In such instances, the natural background level is considered to comply with the water quality objective.

According to the requirements of the Clean Water Act, the Central Valley RWQCB has listed impaired water bodies due to elevated levels of contaminants. The Kern River is not listed as an impaired water body because none of the water quality parameters listed above exceed regulatory action levels (RWQCB 2010).

Regional Hydrogeology

The project area is located within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin (DWR 2006, 2018). The Sub-basin covers the western third of Kern County and includes Kern River and Poso Creek. The project area is located in the central part of the Kern County Sub-basin. Geologically, San Joaquin Valley is a structural trough created by tectonic forces and filled with older marine and younger continental sediments that were eroded from the surrounding mountains. These continental sediments derived from the alluvial processes form a wedge of deposits that thicken toward the center of the valley.

The sedimentary deposits of the San Joaquin Valley have been estimated to range in thickness from 175 to 2,900 feet with an average of approximately 600 feet. Specific yield, the amount of water in storage in the ground that will drain under the influence of gravity and a measurement of water available for human use, ranges from about 3 to 12 percent in silts, 15 to 27 percent in sands and as high as 31 percent for gravels in the interval from the surface down to 300 to 600 feet deep. The highest specific yield measurements are associated with sediments of the Kern Fan west of Bakersfield. The well-sorted, sandy sediments have higher specific yields than finer grained silts and clays. For most of the Sub-basin, excluding the area of the Kern Fan, there are two water bearing units that are separated by an aquitard known as the Corcoran Clay, which restricts vertical groundwater flow between the overlying unconfined aquifer and the underlying confined aquifer. The hydrogeology of the Kern Fan region is characterized by thick alluvial deposits with an upper unconfined aquifer and areas where there are semi-confined conditions. A semi-confined aquifer is also referred to as a leaky aquifer where the confining layer is not continuous and vertical flow occurs between the upper unconfined aquifer and the lower aquifer. Some estimates indicate a total water storage capacity for the Sub-basin of 40 million acre-feet (AF).

The upper aquifer is considered to be unconfined and extends down to a depth of approximately 200 to 400 feet (Note: This regional aquifer designation corresponds to the Layer 1/Upper Aquifer and Layer 2/Intermediate Aquifer defined in the groundwater model described further below in the section on *Methodology, Groundwater Modeling*). The upper unconfined aquifer consists of interbedded silts, sands, with some minor deposits of clay (Meillier 2001). In the Kern Fan area west of Bakersfield, the Corcoran Clay is not generally present although there are

numerous discontinuous clay layers that can locally restrict vertical flow creating a separation between a shallow unconfined aquifer and a deeper semi-confined aquifer. The lower semi-confined aquifer, on average, extends to a depth of approximately 600 feet though in some areas can be quite deeper and generally considered to range between 535 and 750 feet (THC 2015) (Note: This regional aquifer designation corresponds to the Layer 3/Deep Aquifer defined in the groundwater model described further below in section on *Methodology, Groundwater Modeling*).

During the period of 1926 to 1970, groundwater recovery resulted in up to nine feet of land subsidence in the south-central area of the Sub-basin, which does not coincide geographically with the location of the proposed project area in the central portion of the Sub-basin. Groundwater banking operations started as early as 1978 and began diverting surface water into the aquifer throughout the Sub-basin primarily in the Kern Fan area. Since 1970, groundwater levels within the Sub-basin experienced two complete cycles of rising then falling due to climatic wet/dry cycling and addition of conveyance and recharge facilities. By the year 2000, water levels generally equaled those that were observed in 1970 (DWR 2006).

Groundwater Levels and Gradient

Groundwater levels in the Kern Fan area have historically been influenced by groundwater extraction and more recently are dominated by recharge and recovery operations. With the onset of increased groundwater banking and recharge operations in the late 1990s, water levels rose above historic levels but are still susceptible to the effects of groundwater pumping. According to data from monitoring wells in the project area, groundwater levels dropped to historic lows in 2010 and again in 2016 in the project area, as discussed below in the *Project Area Hydrogeology*, section (THC 2019).

Despite fluctuating groundwater levels, over time the regional northwest direction of groundwater flow has remained relatively consistent in the region. However, local changes in aquifer use can cause shifting in gradient direction. Recharge and recovery activities will generally increase the gradient during the early period of a recharge event due to the effective mounding of the groundwater table and decrease, flatten, or even reverse during a recovery period.

Groundwater Banking

Groundwater banking involves recharging water, generally surface water, into an aquifer through wells or infiltration in ponds and channels and then pumping it out as needed. The aquifer essentially functions as a water bank or underground reservoir. Deposits are made in times of surplus and withdrawals occur when available surface water falls short of demand. These groundwater banking programs have supplemented variable surface water supplies and increased reliability during drought years by providing for wet-year carryover (i.e., water stored during a wet year that is recovered during a subsequent dry year). In addition, groundwater banking is accomplished by what is known as in-lieu banking where surface waters are provided in place of having a landowner pump groundwater for their water supply needs.

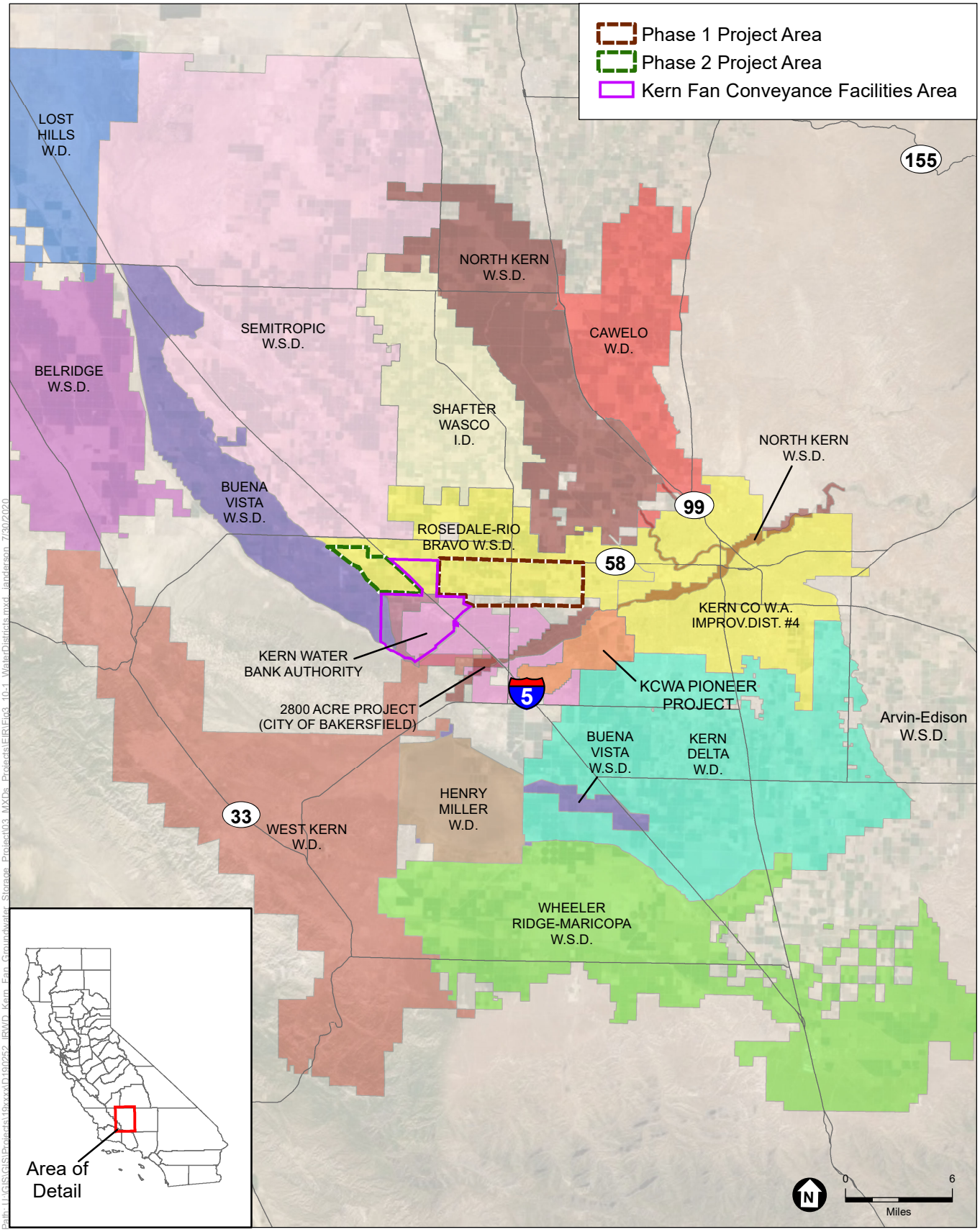
Because of the favorable conditions (e.g. large storage capacities and high permeable soils, etc.), numerous groundwater banking projects are operating in the Kern Fan region. Water districts and municipalities managing groundwater banking operations include the City of Bakersfield, Arvin-

Edison Water Storage District (WSD), Semitropic WSD, Shafter Wasco Irrigation District (ID), North Kern WSD, Rosedale Ranch ID, Cawelo Water District, Improvement District 4, Kern Delta Water District, Henry Miller WD, Buena Vista WSD, Berrenda Mesa Water District, Kern County Water Agency (KCWA; Pioneer Project), Kern Water Bank Authority, West Kern Water District and Rosedale. **Figure 3.10-1** identifies the boundaries of the districts. Surface waters used for recharge are primarily from the Kern River, the State Water Project (SWP), or the Friant-Kern Canal.

The City of Bakersfield was the first documented banking project with their property known as the 2,800-Acres Spreading Area. In the 1990s, banking programs were expanded with the construction of the Kern Water Bank, which includes 7,000 acres of recharge ponds and 13,000 acres of habitat/wildlife land, and the Kern County Water Agency's 2,233-acre Pioneer Banking Project, which was created for groundwater recharge and recovery operations (KCWA 2019). Many of these surrounding water districts have entered into a Memorandum of Understanding (MOU) with the Kern County Water Agency that provides measures to protect the groundwater basin from overdraft, impairing water quality, or otherwise adversely affecting the basin or adjacent entities. The MOU includes details regarding minimum operating criteria, groundwater banking accounting practices, project monitoring responsibilities, and dispute resolution procedures. In addition to the regional MOU, Rosedale has also developed the Long Term Operations Plan and has agreed to the *Project Recovery Operations Plan Regarding Pioneer Project, Rosedale-Rio Bravo Water Storage District, And Kern Water Bank Authority Projects* (Project Recovery Operations Plan), under which both Rosedale and adjoining banking projects are currently required to operate. These Operations Plans implement the provisions of the MOU by designating specific measures to prevent, eliminate or mitigate significant adverse effects resulting from operation of the proposed project. Two MOUs that cover the operations of Rosedale and the Operations Plans are described in Section 1.4.2, *Rosedale Operating Plans*, and provided in Appendix B. The proposed project will be operated in accordance with operative MOUs and Operations Plans. Components relative to the project area hydrology are described further below in the *Project Setting*.

Groundwater Recovery

When a groundwater well is pumped, the aquifer surrounding the well responds with a pattern of drawdown known as a cone of depression. The radius and depth of the cone of depression depends on the hydrogeologic characteristics of the aquifer, pumping rate and duration of pumping in the pumping well. When pumping begins, the water level in the well initially begins to decline as water is removed from storage within the well and surrounding filter pack. For unconfined aquifers, the water level in the well then falls lower than the pre-pumping static condition, causing groundwater to begin to move towards the well. As pumping continues, the water level in the well continues to decrease until the rate of inflow equals the rate of withdrawal. The area of influence formed by pumping an unconfined aquifer results in drainage of water from the sediments through which the water table declines as the cone of depression forms. In an unconfined aquifer, the cone of depression generally expands very slowly. Confined aquifers react a little differently. Withdrawal from the well causes a reduction in aquifer pressure and because storage in a confined aquifer is small, the cone of depression expands rapidly and can be widespread.



SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 3.10-1
Kern County Water Districts

ESA

A residual pumping depression due to drawdown of groundwater levels remains after pumping is discontinued and before the groundwater fully recovers. The shape of the residual pumping depression formed by groundwater recovery is influenced by the daily groundwater pumping schedule. Groundwater depressions change when groundwater wells are turned on and off to respond to varying demand. The residual pumping depression from cyclic pumping resembles the shape of a "pan" rather than a cone.

Regional Recovery Operations

Groundwater recovery in the Kern Fan area fluctuates from year to year and historically tends to be concentrated during the agricultural growing season of May to September (ESA 2015). For example, the KCWA groundwater recovery operations, which do not include the Rosedale groundwater recovery operations, ranged from none in 2011 to 344,084 AF in 2014 (Kern Fan Monitoring Committee 2018).

Regional Recharge Operations

The Kern Fan has been identified as an excellent resource for groundwater banking operations due to its significant storage capacity and highly permeable overlying materials (IRWD & Rosedale 2020). The aquifer has been estimated to range in thickness from approximately 700 to 1,100 feet thick with some thicker areas in the east. The total storage capacity of the Kern County Sub-basin has been estimated by the Kern County Water Agency to be 40 million AF, covering an area of approximately 1 million acres. Of this, approximately 10 million AF of storage is available.

Volumetric recharge rates are controlled by the porosity and permeability of the subsurface materials and total pond area. Aquitards at depth can impede recharge efforts; however, on the Kern Fan and in the project area, these layers impede but do not prevent recharge and recovery operations. The porosity of near surface soils tends to be very important to sustaining long term recharges operations.

Groundwater Storage Capacity

For the purposes of artificial recharge projects, groundwater storage capacity is defined as the theoretical amount of groundwater that can be stored in an aquifer through surface recharge by direct or in-lieu means. The available aquifer storage capacity at any given time is estimated as the difference between the total storage capacity and the existing volume of groundwater storage. Groundwater levels in the Kern Fan Area have been observed to fluctuate significantly over time as a result of recharge and recovery operations. Thus, the available aquifer storage capacity in this area increases during periods of low groundwater levels and decreases during periods of high groundwater levels. As mentioned above, the total storage capacity of the Sub-basin has been estimated by the Kern County Water Agency to be 40 million AF, of which 10 million AF of storage is available.

Regional Groundwater Quality

The San Joaquin Valley Groundwater basin is generally characterized by calcium bicarbonate waters in the shallow zones in the eastern side of the Sub-basin with increasing sodium

concentrations occurring with depth (DWR 2006). Moving west, the bicarbonate levels are replaced by sulfate and chloride such that the west side of the Sub-basin contains primarily sodium sulfate and sodium sulfate characteristics. Total dissolved solids (TDS) concentrations average approximately 400 to 450 milligrams per liter (mg/L) with a total range of 150 to 5,000 mg/L (Kern County Water Agency as referenced in DWR 2006). Shallow groundwater in some areas of the Sub-basin contains high TDS, sodium chloride, and sulfate concentrations. Areas typically associated with lakebed deposits show elevated concentrations of arsenic. Historic agricultural uses of the region have contributed to elevated concentrations of nitrate, 1,2-dibromo-3-chloropropane (DBCP – a soil fumigant), 1,2,3-trocholoropropane (TCP – used in pesticides), and ethylene dibromide (EDB – a pesticide). Other natural concentrations found in the area of interest include α-particles, uranium, barium, boron, and zinc.

Most of the groundwater within the Kern Fan region originates as infiltration or recharge from Kern River surface water. The change in water chemistry between the surface waters of the Kern River and the groundwater occurs as a result of both natural and anthropogenic factors. As the water naturally recharges through the sediments derived from the erosion of the granitic material from the Sierra Nevada mountain range, some constituents such as naturally occurring arsenic and radioactive elements are introduced into the water. Anthropogenic sources of contaminants in the groundwater include agricultural practices, oilfield operations, and accidental spills from hazardous material use associated with commercial and industrial activity.

Project Area Setting

Topography

The project area ranges from approximately one to twelve miles west of Bakersfield. Land surface elevation ranges from about 300 to 350 feet above mean sea level (msl) in the Phase 1 area, about 280 to 290 feet above msl for the Phase 2 area, and about 290 to 315 feet above msl for the Conveyance Area. Both areas are relatively flat with a very gentle slope towards the northwest. The nearest natural surface water body to the project area is the west-flowing Kern River, located approximately one-half to three miles south of the Phase 1 area. The Cross Valley Canal (CVC) is located immediately south of the Phase 1 area. The Goose Lake Channel passes east-west through the Phase 1 area.

Project Area Hydrogeology

The aquifer characteristics of the project area are considered in general to be consistent with the Kern Fan region, which is characterized by a stratified sequence of interbedded alluvial sand and silt. For modeling conducted for the project area discussed further below in the *Groundwater Modeling* section, the subsurface was subdivided into three layers (THC 2019):

- Shallow Aquifer - Layer 1: This layer generally includes the upper 100 to 150 feet of alluvial sediments. Groundwater levels rise up into the layer during high groundwater conditions. During low groundwater level conditions, most of Layer 1 becomes dry. Layer 1 is unconfined and is generally always dry in the project area, even during high groundwater conditions. Consequently, the groundwater model discussed further below in *Methodology, Groundwater Modeling*, often considers Layers 1 and 2 to be a combined shallow/intermediate aquifer.

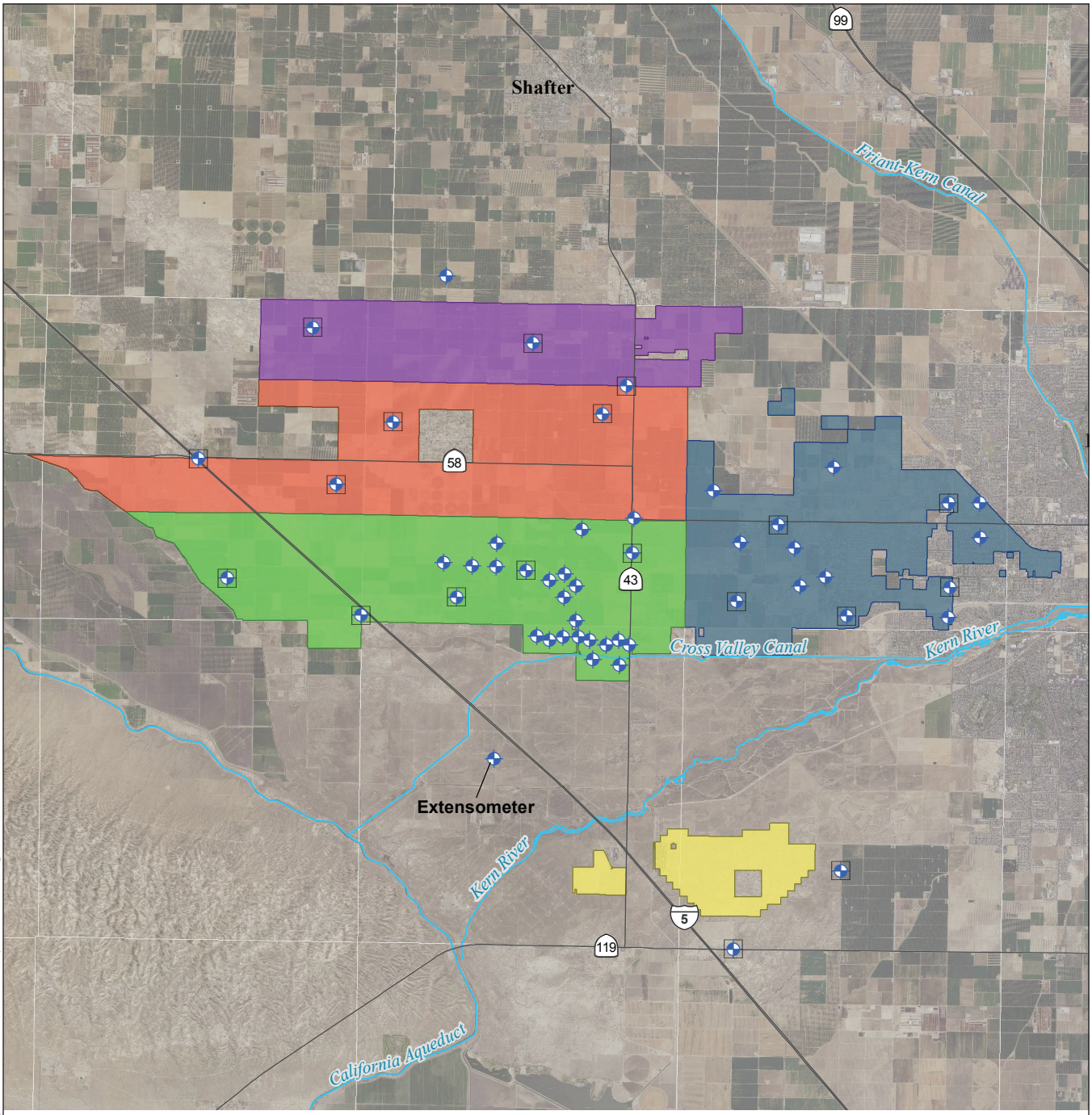
- Intermediate Aquifer - Layer 2: This layer is generally 250 to 350 feet thick and includes the upper screened intervals of many production wells. Layer 2 is generally more permeable than the underlying Layer 3, based on geophysical log signatures. The groundwater chemistry is also distinct from the underlying Layer 3, as discussed further below in the *Project Area Groundwater Chemistry* section. During periods of full saturation, Layer 2 is semi-confined. During periods when groundwater levels drop below the top of Layer 2, it becomes unconfined.
- Deep Aquifer - Layer 3: This layer includes the 600 feet of aquifer below Layer 2. Layer 3 is generally characterized by less permeable sediments than Layer 2 and is always confined.

The Corcoran clay is present in some areas of the valley, including at a depth of about 450 to 500 feet under some of the Phase 2 portion of the project area west of Interstate 5. The Corcoran Clay does not underlie the Phase 1 portion of the project area. The aquifer at depth is considered semi-confined due to the likely presence of finer-grained sediments which, where present, act to retard the vertical flow of groundwater. However, it should be emphasized that these sediments are not uniform across the area in terms of their grain size and hydrogeologic characteristics.

Significant changes in groundwater levels have occurred during the various recharge and recovery cycles in the project area since 1995, when the Kern Water Bank and Pioneer Project began operations. Extreme changes have occurred between 1988 and 2019, as groundwater levels have fluctuated up to 200 feet or more between historical high levels in 2012 and historical low levels in 2017 (THC 2019). Historical groundwater levels in the project area have fluctuated as much as 200 feet or more over 5-year periods depending on area banking activities.

As required by Rosedale's operating agreements (see 1.4.2, *Rosedale Operating Plans*, in the *Methodology* Section further below, and Appendix B), Rosedale monitors groundwater levels on a monthly basis from a network of over 40 wells. Four of these locations are dedicated multi-completion monitoring wells with well screens at various depth intervals so that water level information is also available vertically within the aquifer. The other wells are a combination of agricultural, domestic, and dedicated monitoring wells of known well construction. The locations of the wells in the monitoring network are shown on **Figure 3.10-2**, as well as the four monitoring zones that represent the north, central, south, and east areas of the Rosedale service area.

To illustrate the typical historical groundwater level fluctuations, hydrographs are presented for selected wells in each of the north, central, south, and east zones shown on **Figures 3.10-3** and **3.10-4** (Rosedale 2019) (Note: These hydrographs also present groundwater levels projected out to 2040 used in the model described further below in the section on *Methodology, Groundwater Modeling*). The data shows that between 1981 and 2019, depth to groundwater has fluctuated between approximately 200 to 350 feet in the north zone, 175 to 300 feet in the central zone, 80 feet to 275 feet in the south zone, and 70 to 290 feet in the east zone. However, as shown on Figures 3.10-3 and 3.10-4, overall groundwater levels have continued to decline. Linear regressions through the historical data of the groundwater levels between 1981 and 2019 show long-term groundwater level declines observed throughout the project area and surrounding areas.



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SOURCE: GEI Consultants, 2019

Kern Fan Groundwater Storage Project

Figure 3.10-2
Monitoring Network

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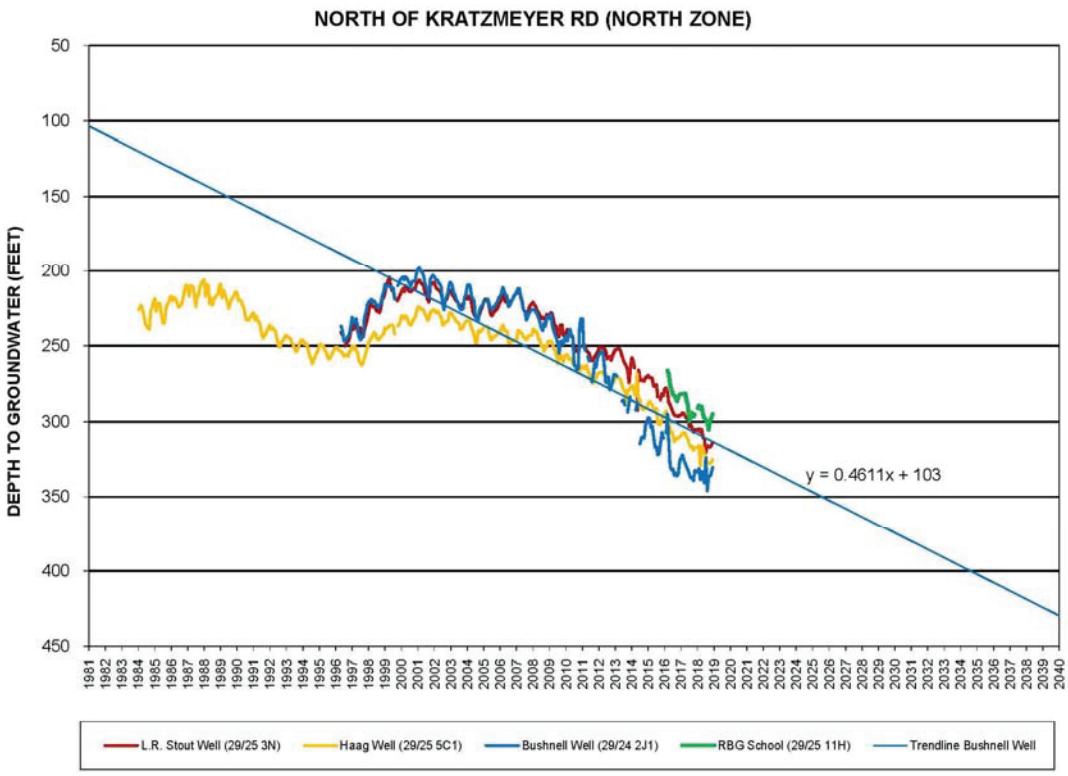

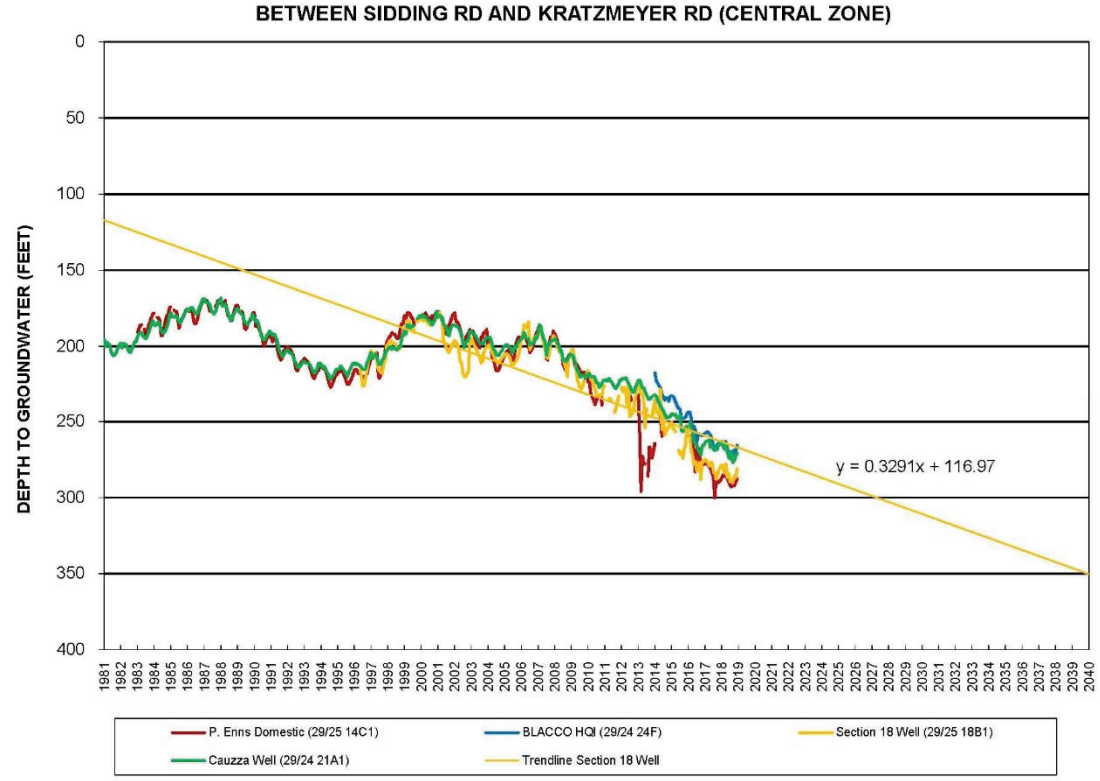

SOURCE: Rosedale-Rio Bravo Water Storage District, 2019

Kern Fan Groundwater Storage Project

Figure 3.10-3
Hydrographs for North and Central Zones

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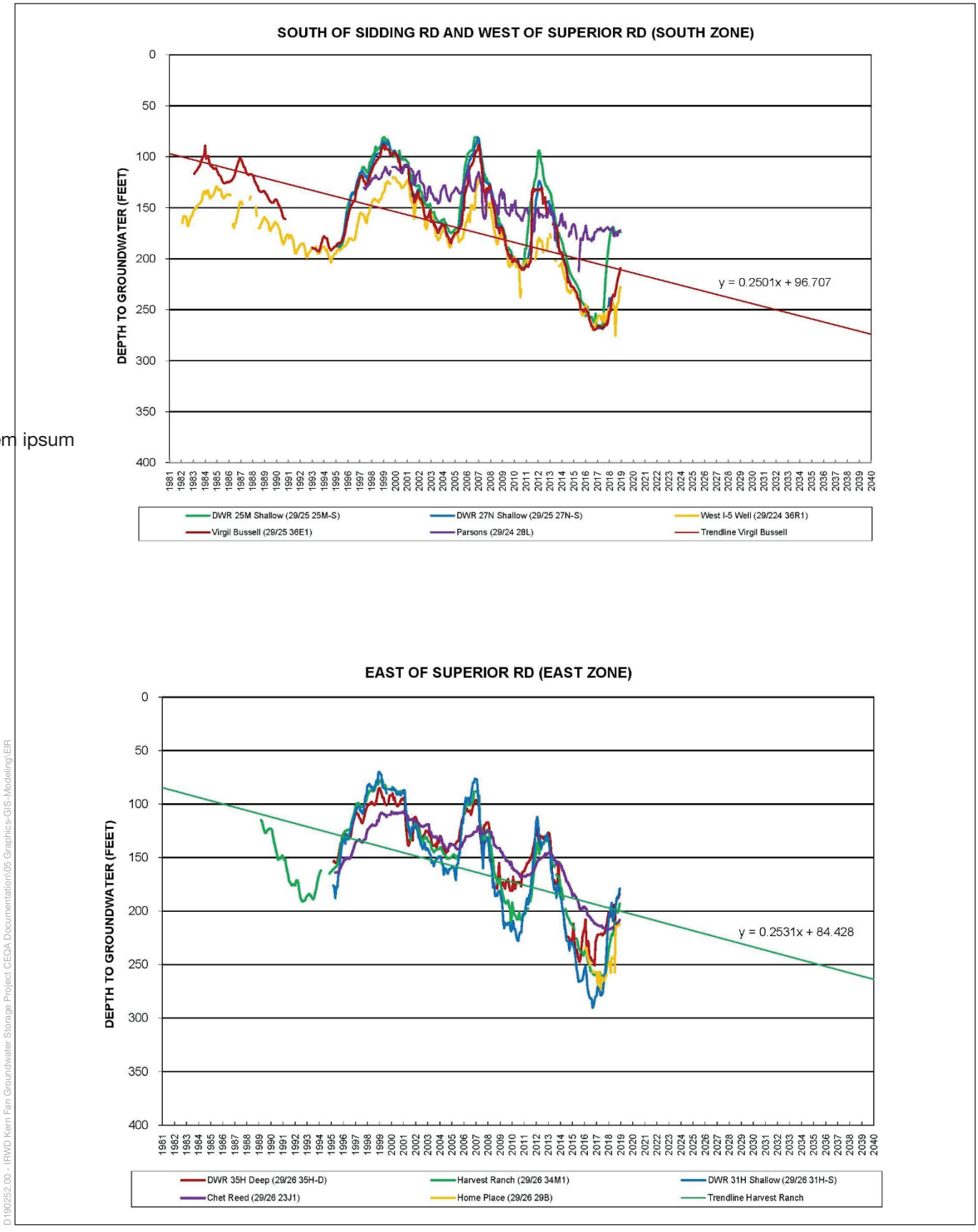


SOURCE: Rosedale-Rio Bravo Water Storage District, 2019

Kern Fan Groundwater Storage Project

Figure 3.10-4
Hydrographs for South and East Zones

ESA

Project Area Storage and Specific Yield

As described in Chapter 1, Rosedale's Conjunctive Use Program manages more than 500,000 AF of stored groundwater in the Sub-basin, with a total storage capacity in excess of 1.7 million AF. As part of the Strand Ranch Project and Stockdale Project, IRWD has developed 126,000 AF of storage capacity.

Over the historical time period of 1988/1989 to 2016/2017, the total change in groundwater storage in the Rosedale Rio Bravo Management Area (RRBMA), which consists of the monitoring zones delineated on Figure 3.10-2, was approximately -378,500 AF with an average annual change in groundwater storage of approximately -12,600 AFY (THC 2019). Specific yield is the ratio between the volume of water the aquifer will release from storage due to gravity drainage to the total volume of aquifer (THC 2015). The shallow and intermediate aquifer system beneath the sites has an estimated specific yield of 0.14, based on pumping test data from a well on the adjacent Strand Ranch Integrated Banking Project property that was perforated in these aquifers. The deep aquifer has an estimated specific yield of 0.10, based on the lithologic characteristics of the sediments from borehole logs near the Project. The KWBA has stated that 1.5 million AF of readily accessible aquifer storage is available in their service area, which covers 20,000 acres (THC 2015). Assuming a specific yield range of 0.10 to 0.14, the KWBA storage estimate requires a useable aquifer thickness between 535 feet and 750 feet, which is consistent with the aquifer thickness assumed for this project (approximately 675 feet).

Project Area Groundwater Quality

As discussed above, the project area has an existing monitoring network for water levels and water quality. The existing monitoring program consists of two elements. The first element consists of sampling the dedicated monitoring wells twice a year for several potential constituents of concern, and sampling banking recovery wells every 3 years. The sampling of the monitoring wells is mandated by the previously discussed MOUs, described in more detail below in the section *Rosedale Operating Plans*.

The second element of groundwater monitoring includes sampling recovery wells according to the monitoring program, and applicable pump-in guidelines. In addition to providing extensive information regarding groundwater quality, the results of this sampling are used to model expected changes in water quality in conveyance facilities receiving the recovered water.

Groundwater quality in the Kern Fan aquifer is generally excellent. The concentration of total dissolved solids (TDS) in the monitoring wells ranges from about 100 milligrams per liter (mg/L) to about 350 mg/L. The TDS in the California Aqueduct can range up to 325 mg/L, and the secondary maximum contaminant level (MCL) for TDS in drinking water is 500 mg/L. The concentration of nitrate in the wells ranges from about 1 mg/L to about 10 mg/L, and the MCL for drinking water is 10 mg/L. However, the concentration of arsenic ranges from about 1 µg/L to about 30 µg/L, and the MCL for arsenic in drinking water is 10 µg/L.

Arsenic concentrations are locally higher in the southern part of the aquifer in the Kern Water Bank area (Negrini et. al 2008). Elevated arsenic concentrations appear to be, at least in part, related to the reducing geochemical environment in lacustrine fan settings that can favor the

formation of arsenic-bearing pyrite. These types of sediments have been identified in the southern part of the Kern Fan. A later change to more oxidizing geochemical conditions potentially dissolves the pyrite and releases the arsenic into the groundwater.

Zone sampling (i.e., sampling at different depths within a well) indicates that arsenic concentrations generally increase with depth (Rosedale 2019). Recovery wells constructed by Rosedale for groundwater banking operations reveal arsenic levels increase with depth, which is the conventional thought in the Kern Fan area.

TCP concentrations above the MCL (0.005 µg/L) has also been detected in the Kern Fan area. Recent data from 24 banking recovery wells in the area ranged from below the non-detection limit of 0.00053 µg/L up to 0.054 µg/L (THC 2020a). Half of the wells were non-detect. The other half of the wells had results of 0.01 to 0.05 µg/L.

Erosion

Erosion and sedimentation are natural processes driven by surface runoff that can be accelerated by human activities such as construction earthwork activities. During construction, removal of vegetation or impervious areas (concrete, asphalt, etc.) expose soils to precipitation and surface runoff and can accelerate surface soil erosion. The process may result in loss of topsoil, creation of erosional features including rills and gullies, and sediment-filled streams and channels. Erosion potential is determined by four principal factors: the characteristics of the soil, extent of vegetative cover, topography, and climate. Soil texture and permeability determine the resistance of soil to entrainment by surface runoff. Vegetative cover plays a critical role in controlling erosion by shielding and binding the soil. Slope influences the rate of runoff and is directly correlated with erosion potential where flatter topography has a much lower potential for erosion. The intensity and duration of rainfall determines the extent and the capacity for flowing water to detach and transport soil particles.

Excessive sedimentation may reduce channel or basin capacities and require increased dredging or cleaning of channels. Erosion along stream banks can erode nearby property, causing a loss of land or possibly increased flooding. Increased sedimentation can also restrict storm drains and channels and lead to flooding during storms that the drainage system should capably handle. In addition, development can increase the likelihood of erosion and sedimentation along unlined drainage channels as a result of increased storm water flows.

In general, granular soils with relatively low cohesion and soils located on steep topography have a higher potential for erosion. As previously discussed, the topography of the project area is nearly flat, resulting in little potential for erosion by water. Areas of bare soil may by susceptible to erosion by wind.

Flooding

A Flood Insurance Rate Map (FIRM) is the official map of a community prepared by the Federal Emergency Management Agency (FEMA) to delineate both the special flood hazard areas and the flood risk premium zones applicable to a community. FEMA has designated various 100-year and 500-year flood zones within the project area, which are generally associated with various creeks

and drainages in the area. A 100-year flood has a 1 percent chance of occurring in a given year, while a 500-year flood has a 0.2 percent chance. FEMA designates flood zones using a series of letters, for example, Zone A indicate areas of the 100-year flood where base flood elevations are not known; Zone AE areas are those where 100-year flood elevations have been calculated; and Zone X areas that experience minimal flooding. The project area is located in a broad area that is designated primarily as Zone X (FEMA 2008).

As noted above, some of the surrounding areas generally associated with various creeks and drainages in the area are located within 100-year (Zone A) or 500-year flood zones (Zone X). As discussed in Section 2.4.2, *Recharge Water Sources*, Reclamation periodically makes excess flood water available during wet years through the CVP, and the USACE makes Kern River water available during wet years when releases from Isabella Reservoir are required for flood control. The proposed project could divert some of this flood water to the proposed Phase 1 and Phase 2 recharge ponds, reducing the flood potential to areas downstream of the project area.

The U.S. Army Corps of Engineers (USACE) prepares flood inundation maps in the event of a dam failure, including for the Lake Isabella dam east of Bakersfield (USACE 2017). The Lake Isabella dam is located about 44 miles to the east of the project area. The estimated inundation area with depths and arrival times are shown on **Figure 3.10-5**. As shown, in the event of a failure of the dam at Lake Isabella, the eastern portion of the Phase 1 area could be flooded with 0 to 5 feet of reservoir water in 14 to 24 hours. The flood waters would not reach the Phase 2 area.

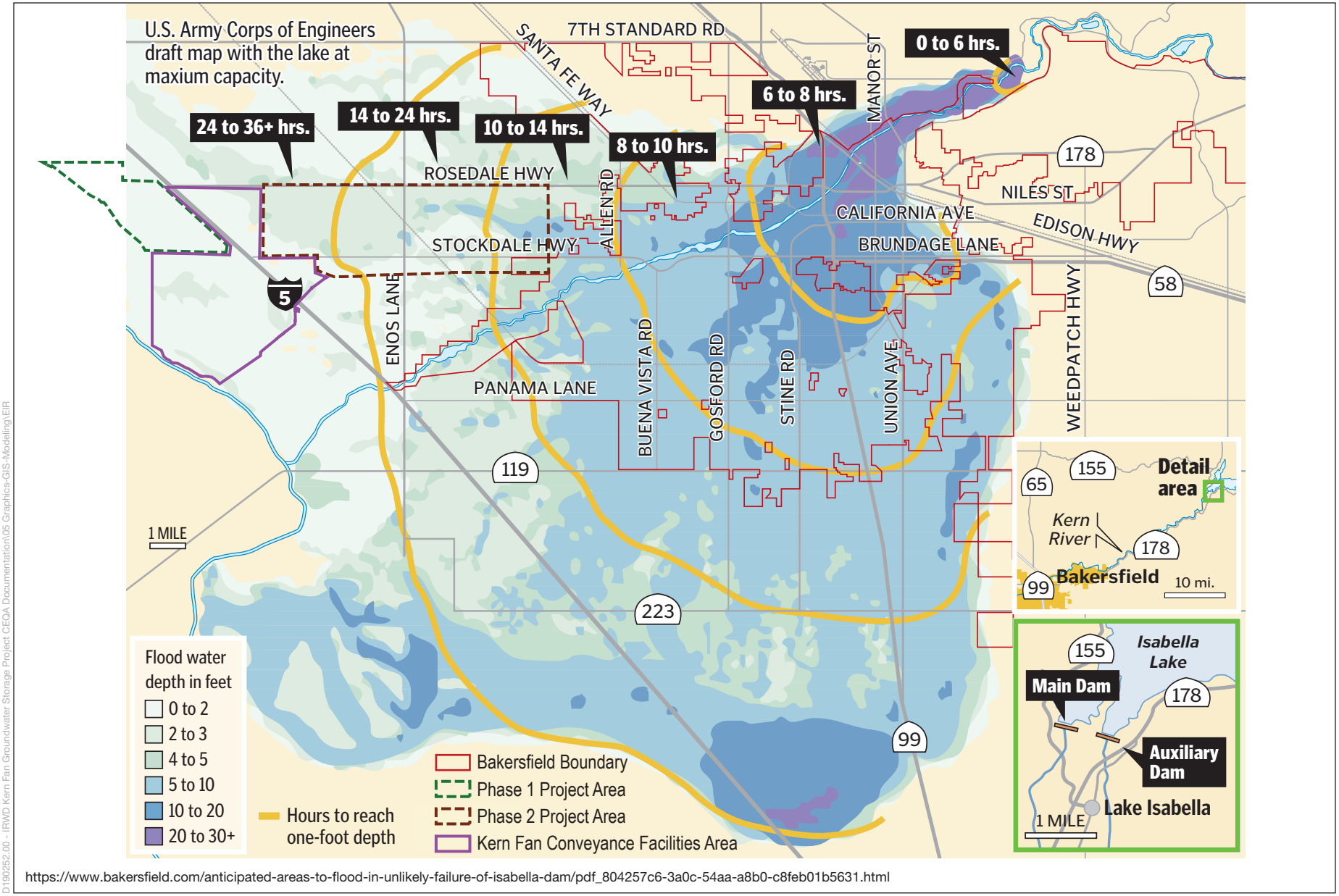
3.10.2 Regulatory Setting

Federal

Clean Water Act

Regulatory authorities exist on both the state and federal levels for the control of water quality in California. The U.S. Environmental Protection Agency (EPA) is the federal agency, governed by the Clean Water Act (CWA), responsible for water quality management.

The purpose of the CWA is to protect and maintain the quality and integrity of the nation's waters by requiring states to develop and implement state water plans and policies. Section 303 of the CWA requires states to establish water quality standards consisting of designated beneficial uses of water bodies and water quality standards to protect those uses for all Waters of the United States. Under Section 303(d) of the CWA, states, territories and authorized tribes are required to develop lists of impaired waters. Impaired waters are the waters that do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water on the lists and develop action plans to improve water quality. This process includes development of Total Maximum Daily Loads (TMDL) that set discharge limits for non-point source pollutants. The recently passed Ducheny Bill (AB 1740) requires the SWRCB and its nine Regional Water Quality Control Boards to post this list and to provide an estimated completion date for each TMDL. The list is administered by the Regional Boards, in this case, Central Valley Regional Water Quality Control Board. The Kern River is not included in the 2010 California 303(d) List of Impaired Water Bodies (RWQCB 2010).



https://www.bakersfield.com/anticipated-areas-to-flood-in-unlikely-failure-of-isabella-dam/pdf_804257c6-3a0c-54aa-a8b0-c8feb01b5631.html

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SOURCE: USACE, 2017

Kern Fan Groundwater Storage Project

Figure 3.10-5
Maximum Inundation Area from Lake Isabella Dam Failure

ESA

National Pollutant Discharge Elimination System

Part of the CWA provides for the National Pollutant Discharge Elimination System (NPDES), in which discharges into navigable waters are prohibited except in compliance with specified requirements and authorizations. Under this system, municipal and industrial facilities are required to obtain a NPDES permit that specifies allowable limits, based on available wastewater treatment technologies, for pollutant levels in their effluent. In California, the EPA has delegated the implementation of this program to the State Board and to the Regional Boards.

Storm water discharges are regulated somewhat differently. Storm water runoff from construction areas of one acre or more require either an individual permit or coverage under the statewide General Construction Storm Water Permit. In addition, specific industries, including waste water treatment plants that have direct storm water discharges to navigable waters are required to obtain either an individual permit issued by the Regional Board, or obtain coverage under the statewide General Industrial Storm Water Permit for storm water discharges.

A non-point source is a diffused source, such as land runoff, precipitation, deposit from the atmosphere, or percolation. Major non-point sources of water pollution are agriculture, mining, oil and gas extraction, pastureland and feedlots, land disposal, and urban runoff. For non-point sources, the Basin Plan outlines the approach that the Regional Board has taken to control non-point source pollution in its Urban Runoff Management scheme. Part of the strategy involves the permitting of storm water discharges from all facilities associated with industrial activities and from all construction activities that result in the disturbance of land totaling one acre or more.

Central Valley Project Improvement Act

Public Law 102-575, passed by the 102nd Congress and signed into law October 30, 1992, is a multipurpose water legislation that contains 40 separate titles providing for water resource projects throughout the West. Title 34, the CVPIA, mandates changes in management of the CVP, particularly for the protection, restoration, and enhancement of fish and wildlife. The purpose of the CVPIA is to mitigate and remedy some of the CVP's adverse environmental effects, specifically, to increase the population and improve the health of the Central Valley's anadromous fish, and increase the acreage and health of wetlands used by migratory birds and other resident wildlife. The CVPIA is managed by the United States Department of Interior through collaboration between Reclamation and the U.S. Fish and Wildlife Service (USFWS).

Ten major areas of change include: 800,000 AFY of water dedicated to fish and wildlife; tiered water pricing applicable to new and renewed contracts; water transfers provision, including sale of water to users outside the CVP service area; special efforts to restore anadromous fish population; restoration fund financed by water and power users for habitat restoration and enhancement and water and land acquisitions; no new water contracts until fish and wildlife goals are achieved; no contract renewals until completion of a Programmatic Environmental Impact Statement; terms of contracts reduced from 40 to 25 years with renewal at the discretion of the Secretary of the Interior; installation of the temperature control device at Shasta Dam; implementation of fish passage measures at Red Bluff Diversion Dam; firm water supplies for Central Valley wildlife refuges; and development of a plan to increase CVP yield.

The project site is located within the CVP Place of Use. The proposed project would participate in water exchanges between the CVP, Reclamation, and CVP Exchange Contractors by facilitating water exchanges, as needed and as available. For example, the project could make water available to the Kern National Wildlife Refuge, which would provide Reclamation operational flexibility in meeting the demands of the CVP Exchange Contractors.

Refuge Water Supply Program

CVPIA Section 3406(d) mandates that 555,515 AF of water of suitable quality be delivered to maintain and improve wetland habitat areas in 19 wetland areas specifically identified in the *Report on Refuge Water Supply Investigations* (USBR 1989a) and the *San Joaquin Basin Action Plan/Kesterson Mitigation Action Plan* (USBR 1989b), collectively referred to as "the Refuges." These Refuges comprise nearly 200,000 acres of wetlands and as such represent almost 50 percent of the wetlands remaining in California's Central Valley. Reclamation created the Refuge Water Supply Program (RWSP) to manage and administer the activities necessary to ensure the acquisition and delivery of this water as required under this section. Like the CVPIA, the RWSP is administered jointly by Reclamation and the USFWS. The refuges within the RWSP include National Wildlife Refuges (e.g., the Kern National Wildlife Refuge), California State Wildlife Areas (e.g., Los Banos Wildlife Area), and various units of the Grassland Resource Conservation District.

CVPIA Water Categories

The 555,515 AFY of water the RWSP is tasked with providing is the sum of all of the specified Refuges' Full Level 4 quantities. The Full Level 4 quantity is defined as the amount of water identified as being required for the optimal management of a designated wetland. Each refuge has a Full Level 4 quantity. Typically, the CVPIA delivers between 75 and 85 percent of the Full Level 4 volume annually. Because some Refuges do not have adequate conveyance capacity to them (e.g., Pixley National Wildlife Refuge, located about 40 miles north of the proposed project), delivered water supplies vary annually with hydrological and climactic conditions. Construction projects enabling these Refuges to receive water supplies have been identified and in some cases are progressing but funding limitations will likely cause this condition to persist. The proposed project could assist in providing Level 4 supplies to the Kern National Wildlife Refuge.

Full Level 4 is a contractually obligated amount of water that consists of two blocks, Level 2 and Incremental Level 4. Each of the benefiting Refuges has its own Level 2 water quantity, which is based on the average water supplies necessary to maintain the wetland areas in existence prior to the passing of the CVPIA or equate to its prior dependably delivered quantity (regardless of water quality) and collectively totals 422,251 AFY. For this reason, the delivery of a Refuge's Level 2 allocation is considered to be essential for a Refuge's successful operation. For those refuges that have the infrastructure to receive it, Level 2 water comes from the CVP, meaning a fixed portion of the federal water supply stored and delivered by the CVP Project is automatically dedicated annually for Refuge use and thus provides a perennially reliable water source. The RWSP manages and funds several long-term contracts, typically 5 to 40 years, with a variety of water agencies to convey this water from its CVP source to a Refuges' boundaries. It is important to note that the individual Refuges determine the amount of this water to be delivered, per month, at

their discretion. This is a unique condition because most CVP water contracts impose limitations on both the total monthly delivery amount and the months in which deliveries may occur.

The incremental difference between the Refuges' Full Level 4 allocation and its Level 2 allocation defines Incremental Level 4 (IL4) and represents the quantity of water necessary for Refuges to ideally manage all lands identified in the refuge reports for the benefit of waterfowl. In most cases, IL4 water is needed to fully support an expanded wetland footprint. Like Level 2 water, each refuge has its own Incremental Level 4 quantity but unlike Level 2 supplies, this water is not dedicated from CVP supply and must be acquired from other sources, such as willing sellers or from those relinquishing their federal or state supplies. The RWSP manages and funds contracts of varied duration to acquire and convey this water from its source to the refuges' boundaries. The suppliers, availability and cost of water available as IL 4 is less predictable than Level 2 supplies because of unpredictable region-wide water needs and usage; the potential lack of sufficient conveyance infrastructure; inconsistent annual natural conditions, specifically rainfall; and occasional water quality concerns. Additionally, individual refuges retain the right to refuse to accept water that the RWSP has the ability to acquire if it is not of suitable quality or does not benefit the refuge at the time it is available. Thus, water supplies delivered in a year may be less than those that were potentially available.

Federal Emergency Management Agency

Under Executive Order 11988, FEMA is responsible for the management and mapping of areas subject to flooding during a 100-year flood event (i.e., one percent chance of occurring in a given year). FEMA requires that local governments covered by federal flood insurance pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year flood plain, as depicted on FEMA maps.

State

State Water Resources Control Board

SWRCB, located in Sacramento, is the agency with jurisdiction over water quality issues in the State of California. The SWRCB is governed by the Porter-Cologne Water Quality Act (Division 7 of the California Water Code), which establishes the legal framework for water quality control activities by the SWRCB. The intent of the Porter-Cologne Act is to regulate factors which may affect the quality of waters of the State to attain the highest quality which is reasonable, considering a full range of demands and values. Much of the implementation of the SWRCB's responsibilities is delegated to its nine Regional Boards. The project area is located within the Central Valley Region.

Regional Water Quality Control Board, Central Valley Region

The Central Valley RWQCB is responsible for the protection of beneficial uses of water resources within the Central Valley Region. The RWQCB uses planning, permitting, and enforcement authorities to meet this responsibility, and adopted the Water Quality Control Plan for the Tulare Lake Basin (Basin Plan) second edition on January, 2004, which was approved by the SWRCB and the Office of Administrative Law. (The Tulare Lake Basin Plan covers only the southern portion of the Central Valley region. The Central Valley Regional Water Quality

Control Board has produced a separate basin plan for the Sacramento and San Joaquin Valley regions.) This updated and consolidated plan represents the Regional Board's master water quality control planning document. The Basin Plan comprehensive program requirements are designed to be consistent with federal regulations (40 CFR Parts 122-124) and are implemented through issuance of NPDES permits to point source and non-point sources of pollutant discharges including construction activities. The Basin Plan identifies beneficial uses and establishes water quality objectives for surface waters in the Region, as well as effluent limitations and discharge prohibitions intended to protect those uses.

NPDES Construction General Permit

Construction associated with the proposed project would disturb more than one acre of land surface affecting the quality of stormwater discharges into waters of the U.S. The proposed project would, therefore, be subject to the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). The Construction General Permit regulates discharges of pollutants in stormwater associated with construction activity to waters of the U.S. from construction sites that disturb one acre or more of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface. The permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground projects, including installation of water pipelines and other utility lines.

The Construction General Permit requires that construction sites be assigned a Risk Level of 1 (low), 2 (medium), or 3 (high), based both on the sediment transport risk at the site and the receiving waters risk during periods of soil exposure (e.g., grading and site stabilization). The sediment risk level reflects the relative amount of sediment that could potentially be discharged to receiving water bodies and is based on the nature of the construction activities and the location of the site relative to receiving water bodies. The receiving waters risk level reflects the risk to the receiving waters from the sediment discharge. Depending on the risk level, the construction projects could be subject to the following requirements:

- Effluent standards;
- Good site management "housekeeping;"
- Non-stormwater management;
- Erosion and sediment controls;
- Run-on and runoff controls;
- Inspection, maintenance, and repair; or
- Monitoring and reporting requirements.

The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific best management practices (BMPs) designed to prevent sediment and pollutants from contacting stormwater from moving offsite into receiving waters. The BMPs fall into several categories, including erosion control, sediment

control, waste management and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

The SWPPP must be prepared before the construction begins. The SWPPP must contain a site map(s) that delineates the construction work area, existing and proposed buildings, parcel boundaries, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the project area. The SWPPP must list BMPs and the placement of those BMPs that the applicant would use to protect stormwater runoff. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Examples of typical construction BMPs include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing and fueling. The Construction General Permit also sets post-construction standards (i.e., implementation of BMPs to reduce pollutants in stormwater discharges from the site following construction).

In the project area, the Construction General Permit is implemented and enforced by the Central Valley Regional Water Quality Control Board, which administers the stormwater permitting program. Dischargers must electronically submit a notice of intent and permit registration documents to obtain coverage under this Construction General Permit. Dischargers are to notify the Central Valley Regional Water Quality Control Board of violations or incidents of non-compliance, and submit annual reports identifying deficiencies in the BMPs and explaining how the deficiencies were corrected. The risk assessment and SWPPP must be prepared by a State Qualified SWPPP Developer, and implementation of the SWPPP must be overseen by a State Qualified SWPPP Practitioner. A legally responsible person, who is legally authorized to sign and certify permit registration documents, is responsible for obtaining coverage under the permit.

California Toxics Rule

The EPA is responsible for implementing federal laws designed to protect air, water, and land. EPA has developed national water quality standards in accordance with the CWA and these standards are used to determine the amount and the conditions under which pollutants can be discharged. The EPA published the California Toxics Rule (CTR) in the Federal Register (FR) establishing water quality standards for toxic pollutants for California waters (FR 31681). On April 28, 2000, the Office of Administrative Law approved the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan [SIP]). The State Water Resources Control Board (SWRCB) adopted the policy in March 2000. The SIP establishes the implementation policy for all toxic pollutants.

California Department of Pesticide Regulation – Restricted Materials Permits and Pesticide Use Report (PUR)

The California Department of Pesticide Regulation (CDPR) is dedicated to protect human health and the environment by regulating pesticide sales and use, and by fostering reduced-risk pest management. The State of California maintains a list of pesticides that are especially dangerous to human health or the environment if used incorrectly, commonly called restricted materials. These pesticides are listed in 3 *CCR* Section 6400. CDPR puts special controls and limitations on these pesticides; furthermore, the purchase or use of restricted materials for agricultural purposes requires a permit from the CAC. Use requirements for these pesticides are given in 3 *CCR* Sections 6445 through 6489.

CDPR maintains a list of registered pesticides known to cause groundwater contamination in California; these pesticides are listed in Title 3, *California Code of Regulations* (3 *CCR*), Section 6800(a): atrazine, bantazon, bromacil, diuron, norflurazon, prometon, simazine. Section 6800(a) pesticides have certain use restrictions. Section 6800(a) pesticides are prohibited below the high water mark inside artificial recharge basins, unless the pesticide is applied six months or more before the basin is used to recharge groundwater (3 *CCR* Section 6487.1).

CDPR also maintains a list of pesticides that have the potential to move to, but are not currently found in groundwater, listed in 3 *CCR* Section 6800(b). Section 6800(b) pesticides are not prohibited for use in artificial recharge basins (CDPR 2009).

CDPR also has regulations pertaining to wellhead protection and the use of pesticides, as listed in 3 *CCR* Section 6609 (CDPR 2009). These measures apply to all wells (irrigation, domestic, municipal, monitoring, abandoned, dry, or drainage wells) where pesticides are mixed, loaded, rinsed, or otherwise used within 100 feet of the well. The following management measures are given by CDPR to protect wellheads:

- Wells protected from runoff:
  - The well should be sited so that no surface water runoff can contact the wellhead including the concrete base, or;
  - A berm should be constructed adjacent to the wellhead to prevent movement of surface water to the wellhead. Preemergent herbicides from the 6800(a) and 6800 (b) lists are prohibited between the berm and the wellhead.
- Wells not protected from runoff: The following activities are prohibited within 100 feet of an unprotected well:
  - Mixing, loading, and storing pesticides,
  - Rinsing of spray equipment or pesticide containers,
  - Maintenance of spray equipment that could result in a pesticide or pesticide residue spill,
  - Application of preemergent herbicides from the Section 6800(a) and Section 6800 (b) lists.

California became the first state to require full reporting of agricultural pesticide use in response to demands for more realistic and comprehensive pesticide use data. Under the PUR program, all

agricultural pesticide use must be reported monthly to county agricultural commissioners, who in turn, report the data to CDPR.

Sustainable Groundwater Management Act of 2014

The Sustainable Groundwater Management Act of 2014 (SGMA), effective January 1, 2015, authorizes local agencies to manage groundwater in a sustainable manner and allows limited state intervention when necessary to protect groundwater resources. The SGMA requires the creation of a Groundwater Sustainability Agency (GSA) that would develop and implement a Groundwater Sustainability Plan (GSP) to manage and use groundwater in a manner that can be maintained during the planning and implementation horizon without undesirable results, defined as follows:

(1) Chronic lowering of groundwater levels, indicating a significant and unreasonable depletion of supply;

(2) Significant and unreasonable reduction of groundwater storage;

(3) Significant and unreasonable seawater intrusion;

(4) Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies;

(5) Significant and unreasonable land subsidence that substantially interferes with surface land uses; or

(6) Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

The project area is located within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin (Basin No. 5-022.14), which is a high-priority basin. The Sub-basin includes 11 organized GSAs. Of these, six GSAs elected to be included in the GSP of the Kern Groundwater Authority, including Rosedale (RRBWSD 2019). The Kern Groundwater Authority, the designated local GSA, submitted its groundwater sustainability plan (GSP) on January 1, 2020 (KGA 2020).

The following basin sustainability goals related to groundwater supply reliability and protection of water quality were developed for the Kern Groundwater Authority GSP:

- Achieve sustainable groundwater management in the Kern County Sub-basin through the implementation of projects and management actions at the member agency level of each GSA.
- Maintain its groundwater use within the sustainable yield of the basin as demonstrated by monitoring and reporting groundwater conditions.
- Operate within the established sustainable management criteria, which are based on the collective technical information presented in the GSPs in the Sub-basin.
- Collectively bring the Sub-basin into sustainability and maintain sustainability over the implementation and planning horizon supplies are managed to optimize water supply reliability and minimize land subsidence.

The KGA members have sources of water supplies such as local streams (Caliente, Poso Creek), Kern River, State Water Project and Central Valley Project sources. Each member addresses their own individual water supply sources in greater detail in their individual management area plans along with how the beneficial users in their jurisdiction will participate in achieving sustainability.

The KGA members have also identified more than 150 projects and management actions ranging from expansion of local and regional conveyance and recharge facilities to take advantage of surplus supplies; new conveyance and recharge projects; and participation in the California WaterFix or other through-Delta improvement projects. Management actions range from implementing district level fee structures to incentive reduced groundwater pumping; participation in local, regional, and state-wide water markets; and setting allocation for groundwater use by landowner, based on the sustainable yield of management areas.

The coordinated modeling effort shows that implementation and completion of the identified projects and management actions during the implementation period of 2020 to 2040, as stated in the individual management area plans and GSPs from the other GSAs in the Sub-basin, would result in an average surplus of 85,578 acre-feet per year over the projected baseline condition simulation (KGA 2020).

Minimum Thresholds

To assist in establishing measurable sustainability goals, the Kern Groundwater Authority GSP quantified Minimum Thresholds in certain wells to avoid adverse impacts (THC 2019). Minimum Thresholds goals were identified for certain monitoring wells or observation points within the Rosedale service area. The Minimum Thresholds were selected to coincide with the lowest groundwater level observed during the 2015 to 2018 time period, a period of historical low groundwater levels.

Local

Kern County General Plan

The Kern County General Plan includes elements to protect the groundwater and surface water resources of the county through various goals and policies. The following policies would apply to the proposed project:

- Encourage the development of the County's groundwater supply to sustain and ensure water quality and quantity for existing users, planned growth, and maintenance of the natural environment.
- The Kern County Environmental Health Services Department will develop guidelines for the protection of groundwater quality which will include comprehensive well construction standards and the promotion of groundwater protection for identified degraded watersheds.
- Encourage effective groundwater resource management for the long-term benefit of the County through the following:
  - Promote groundwater recharge activities in various zone districts.

- Support for the development of Urban Water Management Plans and promote Department of Water Resources grant funding for all water providers.
- Support the development of Groundwater Management Plans.
- Support the development of future sources of additional surface water and groundwater, including conjunctive use, recycled water, conservation, additional storage of surface water, and groundwater and desalination.

Kern County Code - Water Well Ordinance

Title 14 Section 14.08 of the *Kern County Code* regulates Water Well Systems and includes well construction standards and permitting procedures. The well construction standards include reference to the adoption of California Department of Water Resources well construction standards found in Bulletin 74-81 which was amended with Bulletin 74-90.

Kern County Floodplain Management Ordinance

Kern County has adopted regulations designed to promote the public health, safety, and general welfare of its citizenry by minimizing public and private losses due to flood conditions. The Kern County Floodplain Management Ordinance (*Kern County Code* Section 17.48) restricts land use and development that are vulnerable to floods or water erosion hazards or that would divert flood waters or increase flood hazards in other areas. The Ordinance also requires that uses vulnerable to floods be protected against flood damage and controls the alteration of natural floodplains. The Ordinance requires a development permit prior to construction within any area of special flood hazards. The Ordinance prohibits the encroachment of new development into areas of special flood hazard, such as those classified on FEMA flood hazard maps, unless a registered professional engineer or architect certifies and demonstrates that no increase in flood levels will occur during a base flood discharge (*Kern County Code* Section 17.48.320).

3.10.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to hydrology and water quality. The proposed project would have a significant impact if it would:

1. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.
2. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
3. 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:
    a. Result in substantial erosion or siltation on- or off-site;
    b. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

c. 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

d. Impede or redirect flood flows.

4. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
5. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.
6. Result in cumulatively considerable impacts to hydrology and water quality.

Methodology

General

This environmental analysis of the potential impacts related to hydrology and water quality is based on a review of the following information: the description of the proposed project provided in Chapter 2, *Project Description*; a review of available literature (hydrology and water quality reports and maps); and review of the existing conditions of the project area, as described above in Section 3.10.1, *Environmental Setting*.

The proposed project would be regulated by the various laws, regulations, and policies summarized above in Section 3.10.2, *Regulatory Setting*. Compliance by the proposed project with applicable federal, state, and local laws and regulations is assumed in this analysis and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with some regulations is a condition of permit and project approval.

After considering the implementation of the proposed project described in Chapter 2, *Project Description*, and compliance with the required regulatory requirements, the environmental analysis below identifies if the defined significance thresholds are exceeded and, therefore, a significant impact would occur. For those impacts considered to be significant, mitigation measures are proposed to the extent feasible to reduce the identified impacts.

Rosedale Operating Plans

As described in Chapter 1, *Introduction*, and provided in Appendix B, the proposed project would be operated in accordance with the following agreements:

- Rosedale's Memorandum of Understanding Regarding Operation and Monitoring of the Rosedale-Rio Bravo Water Storage District Groundwater Banking and Sale Program. This initial agreement was signed and became operational as of May 10, 2004.
- Rosedale's First Amended Memorandum of Understanding Regarding Operation and Monitoring of the Rosedale-Rio Bravo Water Storage District Groundwater Banking and Sale Program
- Rosedale's Long Term Operations Plan Regarding Rosedale-Rio Bravo Water Storage District Projects

- Project Recovery Operations Plan Regarding Pioneer Project, Rosedale-Rio Bravo Water Storage District, And Kern Water Bank Authority Projects

These agreements describe specific measures to be employed to prevent, eliminate, or mitigate significant adverse impacts from project operations within areas of concern, which specifically refer to the surrounding and nearby water districts, as well as groundwater users (e.g., agricultural and domestic water supply wells). Relative to hydrology and water quality, the agreements include the following requirements:

- Monitor groundwater conditions when Rosedale is recovering previously stored groundwater.
- Regularly update its groundwater model to current conditions to evaluate groundwater impacts from its operations.
- Establish triggers and actions when groundwater levels decrease to those pre-established trigger levels (see *Groundwater Modeling* section further below for Minimum Thresholds for groundwater levels).

Groundwater Modeling

A numerical groundwater flow model, referred to as the Kern Fan Area model, was originally developed in 2010/2011 to evaluate the impacts of area banking projects on groundwater levels in the Rosedale area (THC 2019). The model has been updated a number of times to evaluate the impacts of management actions and proposed projects. The groundwater flow model was expanded in 2017 to encompass the entire Rosedale service area and is updated annually with hydrology data, groundwater level data, groundwater production, crop consumptive use, and water deliveries.

For purposes of SGMA compliance and to support the Kern Groundwater Authority GSP, which was submitted to DWR on January 1, 2020 (see Section 3.10.2, *Regulatory Setting*, above), the model was updated in 2019 to evaluate the impacts of management actions and future projects that Rosedale is planning. The model was further updated in 2020 and run to consider the effects of the proposed project.

Although the locations for the recharge and recovery facilities for the proposed project have not yet been finalized, for purposes of evaluating potential impacts associated with operation of the proposed project, example recharge areas and recovery (extraction) wells were sited in and around the Phase 1 and Phase 2 areas within the project area boundary. The Kern Fan Area model was used to evaluate the impacts of proposed recharge and recovery at these representative recharge areas and recovery wells, which are shown on **Figure 3.10-7**. The recharge areas and proposed recovery well locations were selected based on the University of California at Davis' Soil Agricultural Groundwater Banking Index (SAGBI) that identifies favorable areas of recharge based on deep percolation potential, root zone residence time, topography, chemical limitations, and soil surface condition (THC 2020b). The three recharge areas are referred to as the western, central, and eastern basins, according to their relative geographic location. The western basin is west of Interstate 5; the central basin is east and adjacent to Interstate 5; and the eastern basin is east of Interstate 5 and the central basin (see Figure 3.10-7).

Proposed Project 2020 Model Run

The 2020 model run evaluates the anticipated changes in groundwater levels that would occur as a result of the proposed project (THC 2020b). The model run assumes that the maximum volume of water would be available for recharge for all three example recharge basins, which resulted in a maximum recharge volume of 117,400 AF. This maximum recharge volume was selected to estimate the maximum amount of groundwater mounding due to recharge or later recovery from storage that could occur. The modeled time period uses recent groundwater level records from 2000 to 2018 to simulate the baseline conditions. The results of the 2020 model run are summarized below.

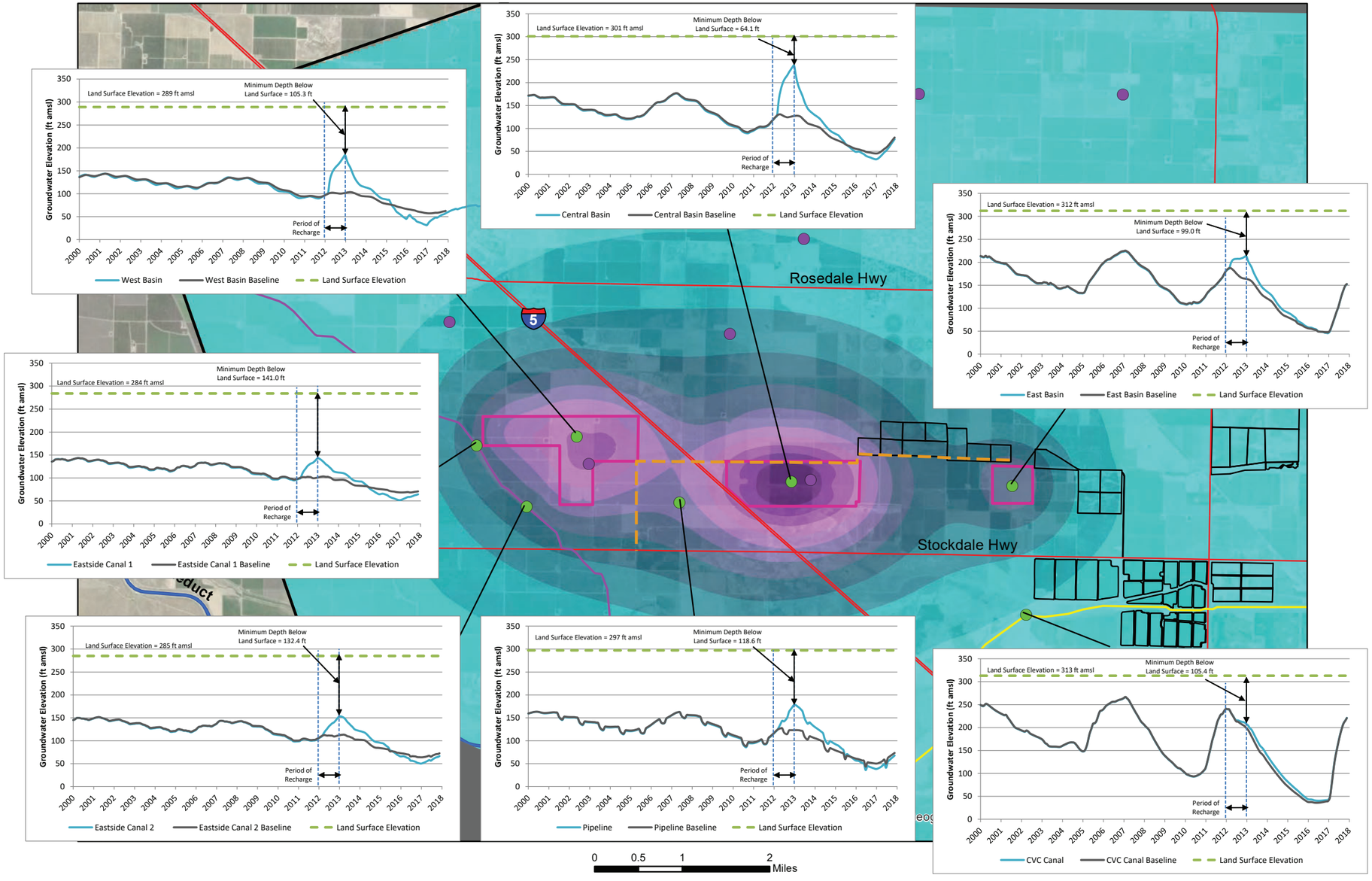
Maximum Mounding during Recharge

The 2020 model run simulated the maximum amount of mounding that could occur if recharge was conducted during relatively high groundwater conditions. The year of 2012 was selected for the recharge event to simulate mounding during recent relatively high groundwater conditions. The projected amount of mounding in the Shallow/Intermediate Aquifers (Layers 1 and 2) is shown on **Figure 3.10-6**, which quantifies the amount of mounding estimated to occur at model simulated observation points (i.e., the observation points are not actual existing wells). As previously discussed, the Shallow Aquifer (Layer 1) is typically dry beneath the project site; mounding that could affect surface infrastructure, such as aqueducts and canals, would only occur due to mounding of the Intermediate Aquifer that rises up thru the Shallow Aquifer. The model simulates hydrographs at observation points located within each of the three example recharge ponds, and beneath the Central Valley Canal and Eastside Canal. The results indicate that groundwater levels would not rise to any closer than 64 feet of the ground surface during a maximum mounding event.

Drawdown during Recovery of Stored Water

The 2020 model run simulated the maximum amount of drawdown that could occur if recovery of stored water was conducted during relatively low groundwater conditions. The anticipated amount of groundwater level drawdown in the Intermediate Aquifer that would occur during the recovery of stored water is shown on **Figure 3.10-7**. The 2015 to 2017 time period is selected to model drawdown during a period of relatively low groundwater conditions. The potential recovery (pumping) rate is based on the typical pumping rate of more than 3,000 gallons per minute for local wells screened in the Intermediate and Deep Aquifers. The model assumes 12 recovery wells perforated in both the intermediate and deep aquifer systems to enable recovery of 50,000 AF in the first year of a two-year recovery cycle and 40,000 AF in the second year. As shown, groundwater levels would decrease to below baseline conditions for a brief time period and then recover to baseline conditions.

To further evaluate the effects of drawdown, the 2020 model run identified the lowest modeled groundwater levels that would occur during drawdown in Rosedale Monitoring Wells 1 through 7, which are the seven wells designated in the GSP for monitoring groundwater levels in this area. Each of these wells monitors groundwater levels in both the Intermediate and Deep Aquifers. One of the primary goals of the GSP is to maintain groundwater levels above the Minimum Thresholds designated in these seven wells (Minimum Thresholds are explained further below in this *Methodology* section). **Figures 3.10-8 and 3.10-9** compare the Minimum Thresholds to the anticipated deepest level of groundwater drawdown in the Intermediate and



NAD 83 Stateplane Zone 5

Map Features

Maximum Groundwater Level Mounding (ft)

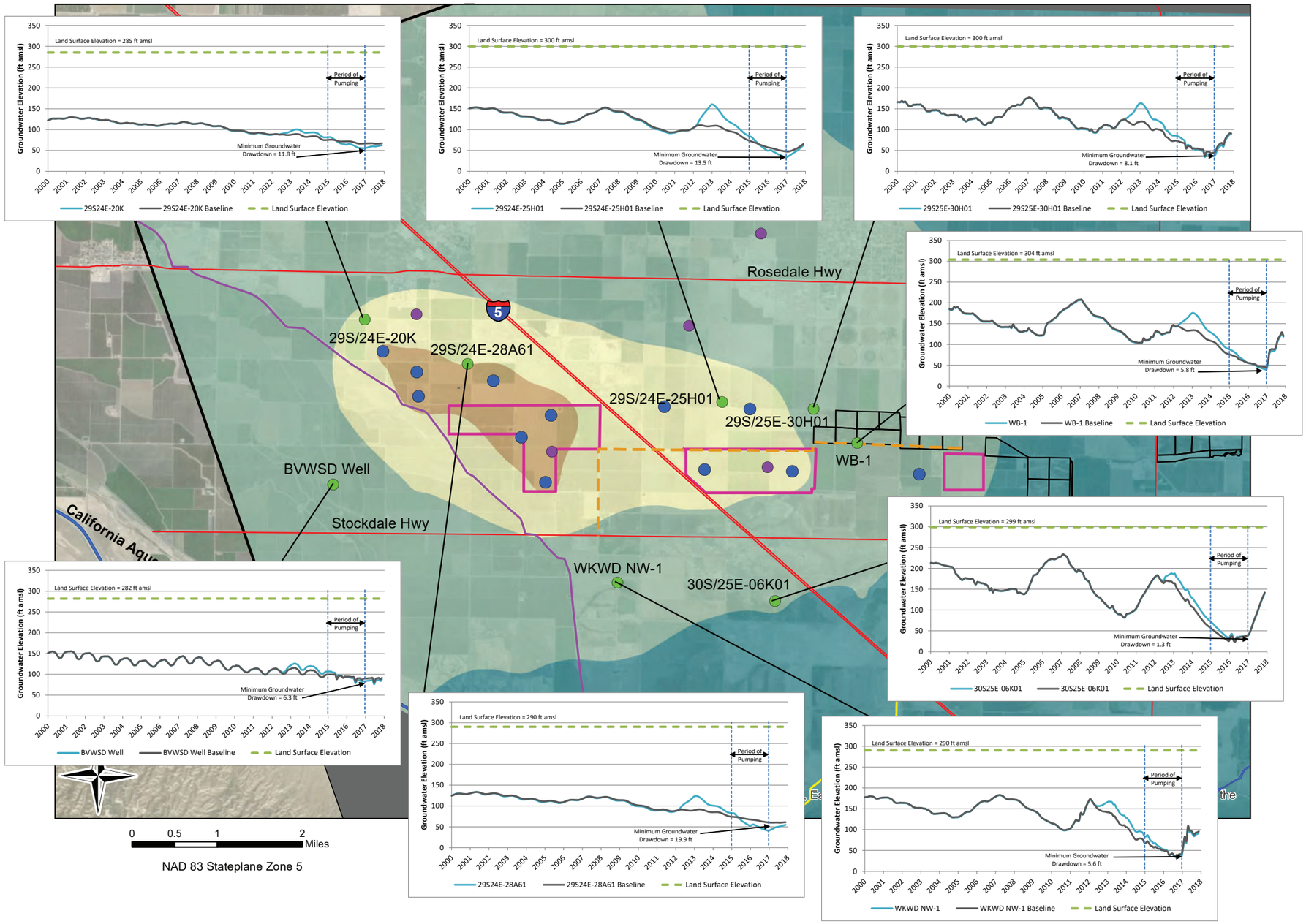
- >100
- 90 to 100
- 80 to 90
- 70 to 80
- 60 to 70
- 50 to 60
- 40 to 50
- 30 to 40
- 20 to 30
- 10 to 20
- 0 to 10
- SGMA RMS Well
- Modeled Observation Point
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Eastside Canal
- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Water Courses

Note: Based on December 2012 baseline conditions

SOURCE: Thomas Harder & Co., 2020

Kern Fan Groundwater Storage Project

Figure 3.10-6
Recharge Mounding – Intermediate Aquifer



Map Features

Maximum Groundwater Level Drawdown (ft)

- 0 to 10
- 0 to -10
- -10 to -20
- 20 to -30
- < -30
- SGMA RMS Well
- Proposed Extraction Well
- Modeled Observation Point
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Eastside Canal
- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Water Courses

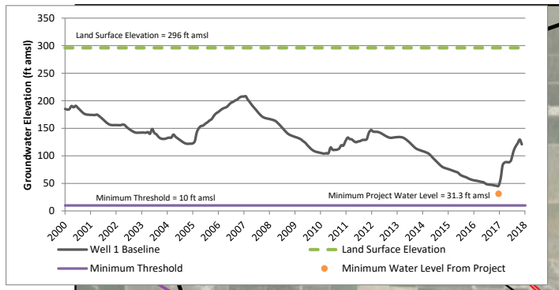
Note: Based on December 2016 baseline conditions

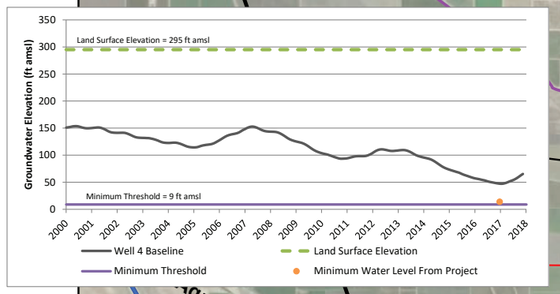
SOURCE: Thomas Harder & Co., 2020

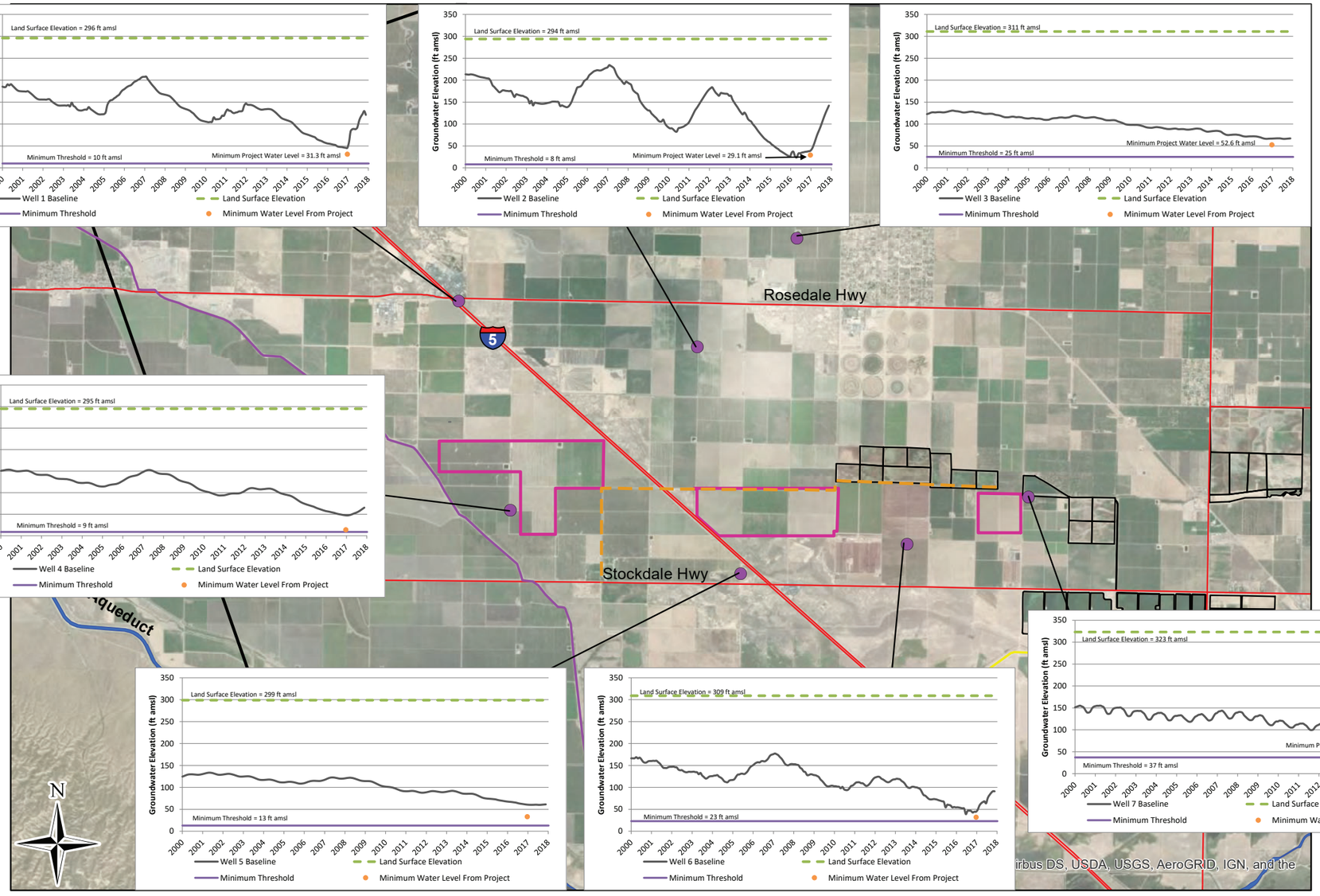
Kern Fan Groundwater Storage Project

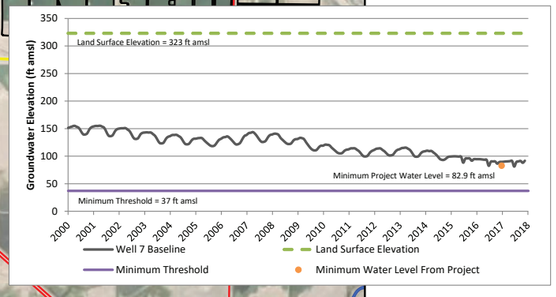
Figure 3.10-7
Recovery Drawdown

ESA









Map Features

- SGMA Water Level Well
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Eastside Canal
- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Water Courses

NAD 83 Stateplane Zone 5

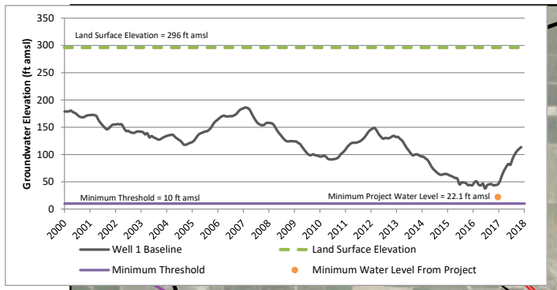
Note: Based on December 2016 baseline conditions

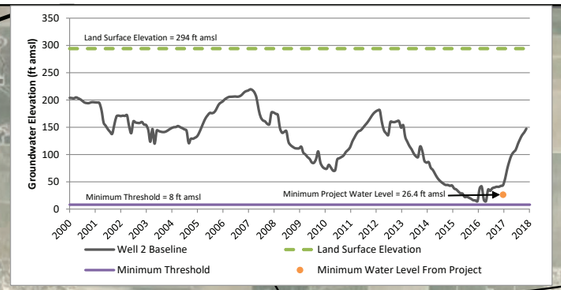
SOURCE: Thomas Harder & Co., 2020

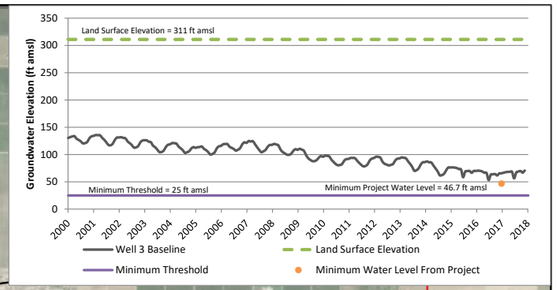
Kern Fan Groundwater Storage Project

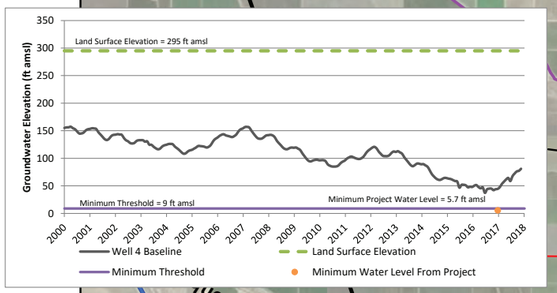
Figure 3.10-8
Minimum Water Levels to Minimum Thresholds – Intermediate Aquifer

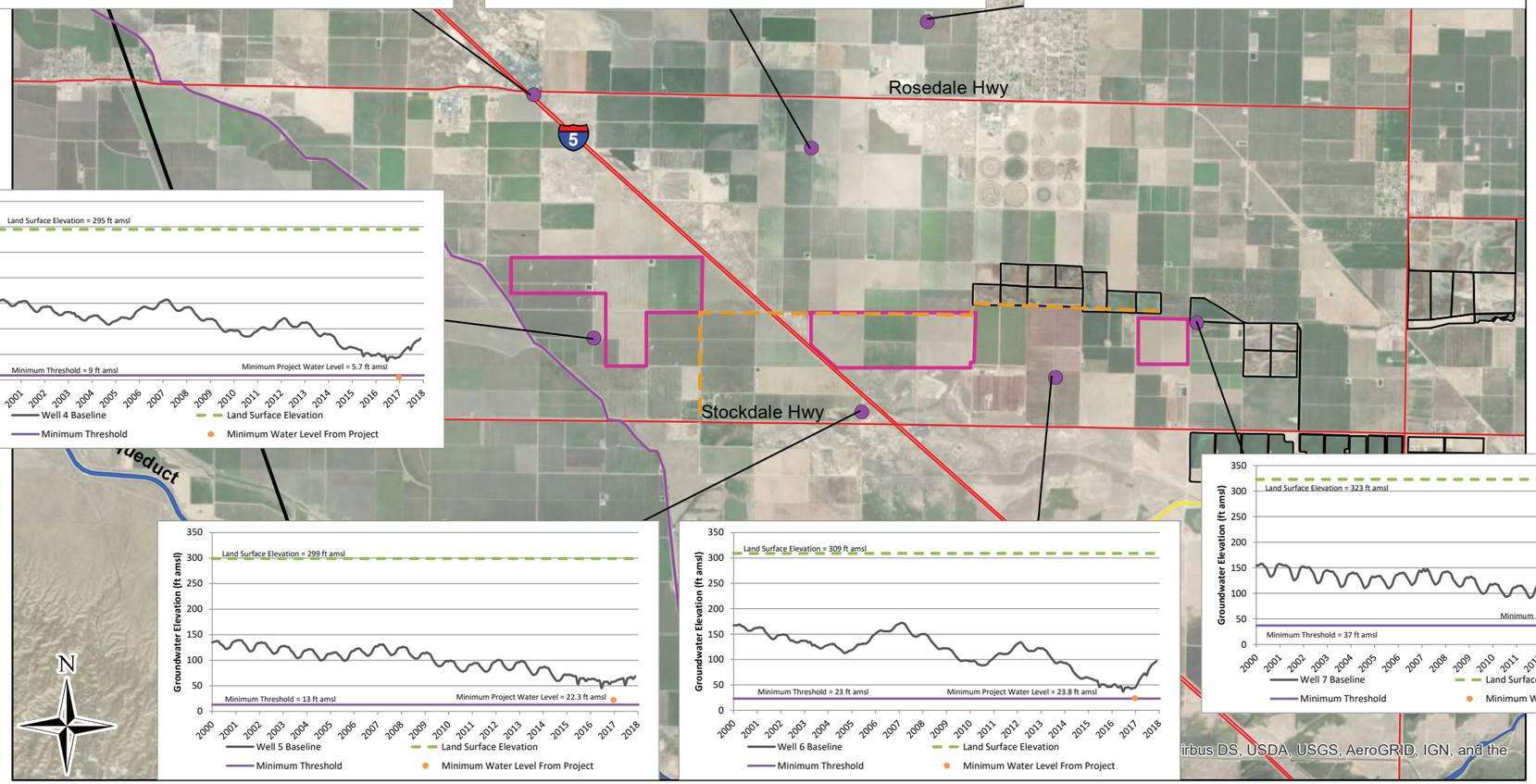
ESA











Map Features

- SGMA Water Level Well
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Eastside Canal
- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Water Courses

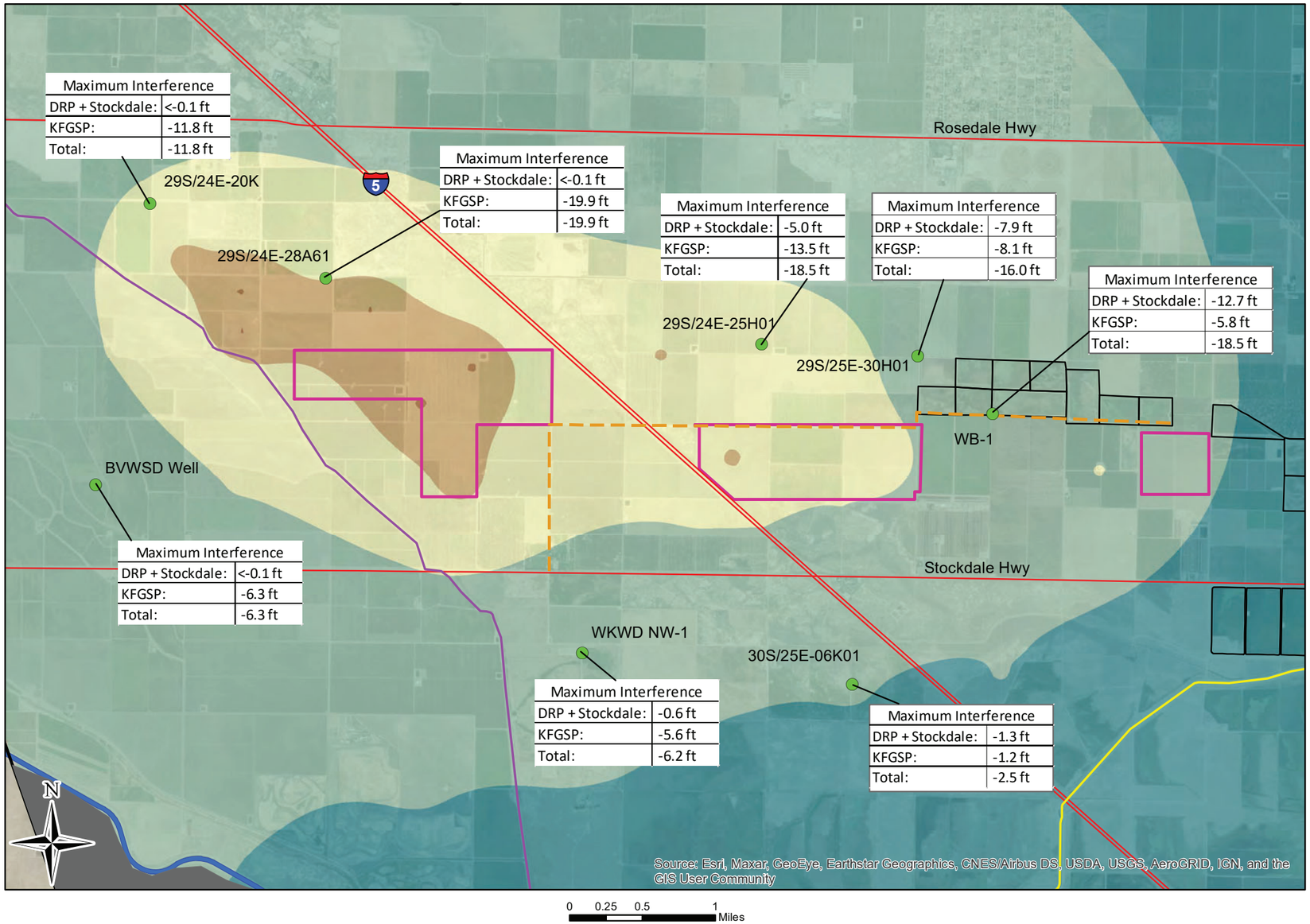
Note: Based on December 2016 baseline conditions

SOURCE: Thomas Harder & Co., 2020

Kern Fan Groundwater Storage Project

Figure 3.10-9
Minimum Water Levels to Minimum Thresholds – Deep Aquifer

ESA



Map Features

Maximum Groundwater Level Drawdown (ft)

- 0 to 10
- 0 to -10
- -10 to -20
- 20 to -30
- < -30
- Modeled Observation Point
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Eastside Canal
- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Water Courses

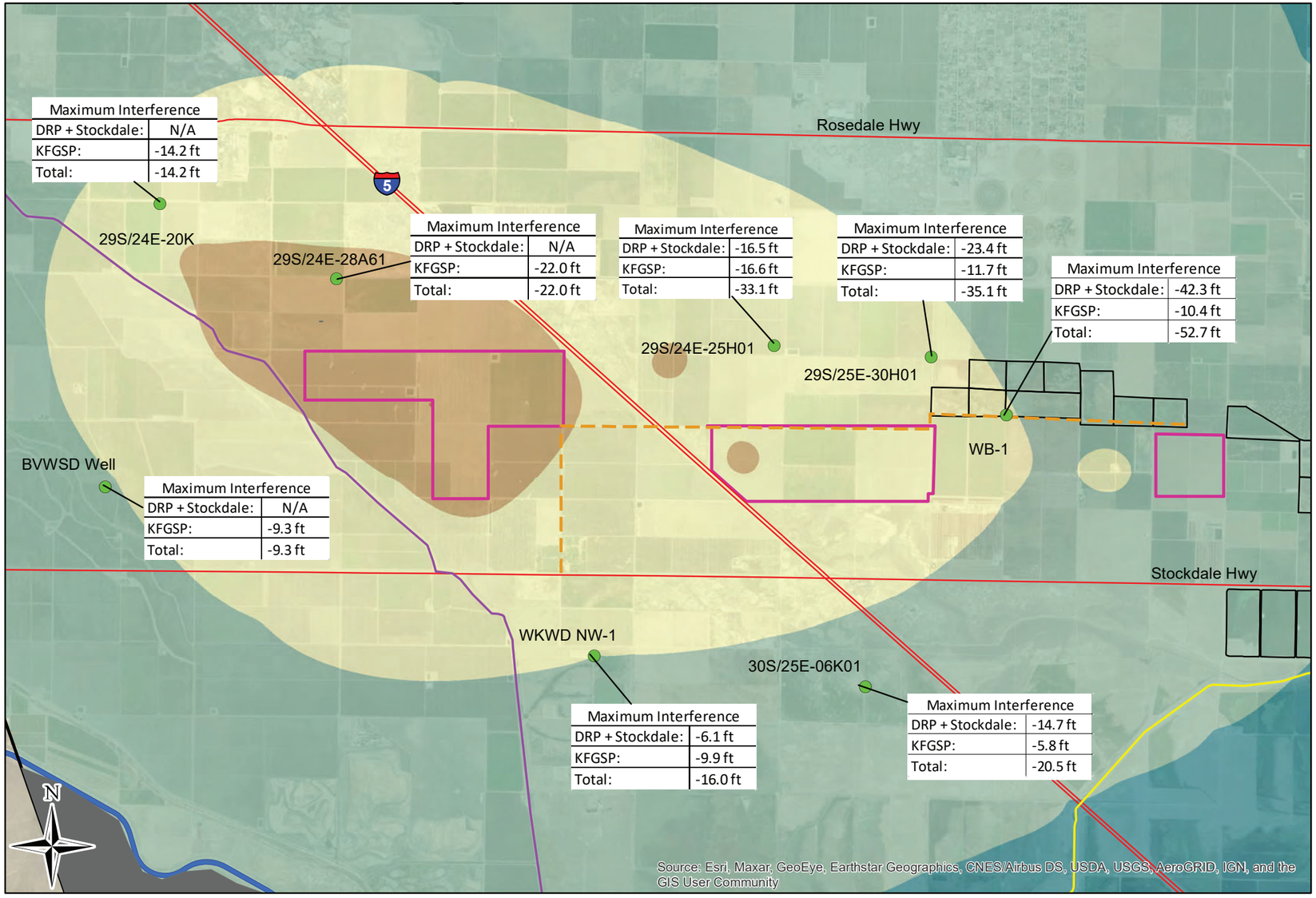
Note: Based on December 2012 baseline conditions

SOURCE: Thomas Harder & Co., 2020

Kern Fan Groundwater Storage Project

Figure 3.10-10
Cumulative Well Drawdown – Intermediate Aquifer

ESA



Map Features

Maximum Groundwater Level Drawdown (ft)

- 0 to 10
- 0 to -10
- -10 to -20
- -20 to -30
- < -30
- Modeled Observation Point
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Eastside Canal
- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Water Courses

Note: Based on December 2012 baseline conditions

SOURCE: Thomas Harder & Co., 2020

Kern Fan Groundwater Storage Project

Figure 3.10-11
Cumulative Well Drawdown – Deep Aquifer

ESA

Deep Aquifers, respectively. The deepest projected project groundwater levels during maximum pumping in the Intermediate Aquifer are not expected to exceed the Minimum Thresholds at the Rosedale monitoring wells, although groundwater levels immediately west of the western basins and in between the central and eastern basins could approach the Minimum Thresholds during recovery of stored water. The deepest projected groundwater levels in the Deep Aquifer during maximum pumping drawdown slightly exceed the Minimum Threshold at the westernmost Rosedale monitoring well and are at the Minimum Threshold at the monitoring well between the central and eastern recharge basins. Groundwater levels would be expected to recover to above the minimum thresholds once pumping is stopped. The projected project-related groundwater levels in the other Deep Aquifer wells do not reach the Minimum Thresholds.

Cumulative Drawdown during Recovery of Stored Water

The 2020 model run simulated the cumulative pumping drawdown predicted for nearby private and project wells that could result if the nearby Drought Relief Project (DRP) and Stockdale Integrated Banking Project are recovering stored water at the same time as the proposed project. The effects of groundwater drawdown would be additive and are shown for wells in the Intermediate and Deep Aquifers on **Figures 3.10-10 and 3.10-11**, respectively. As shown, the maximum cumulative drawdowns that would occur in the Intermediate Aquifer range from 2.5 feet at the Kern Water Bank Well 30S/25E-06K01 to 19.9 feet at Well 29S/24E-28A61 in the northern portion of the Phase 2 area. The maximum cumulative drawdowns that would occur in the Deep Aquifer range from 9.3 feet at the BVWSD Well west of west recharge basin and the Phase 2 area, to 52.7 feet at Rosedale's Well WB-1 in between the central and east recharge basins. These cumulative well drawdowns would only occur in the event that all three groundwater banking projects were to recover stored water at the same time. Note that the largest drawdowns would occur in Rosedale wells, with much smaller to no drawdown in neighboring wells. Given the existing seasonal groundwater level fluctuations in the region that are on the order of 200 or more feet, this amount of fluctuation is not expected to expose and damage well pumps.

Impact Analysis

Water Quality

Impact 3.10-1: The proposed project could violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality. (*Less than Significant Impact with Mitigation*)

Construction

Construction of the proposed project would require excavation, grading and recontouring of soil at the project area. During these activities, soils could be become exposed to high winds or heavy precipitation causing a substantial increase in sedimentation in storm water run-off. In addition, construction activities would require the use of hazardous materials including but not limited to petroleum products (e.g., gasoline, diesel, and motor oil) and automotive fluids (e.g., antifreeze and hydraulic fluids). The mobilization of sediment or inadvertent spills or leaks of such pollutants could affect the quality of runoff water from the construction sites. However, because the project would disturb more than one acre, construction would be subject to the NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity

(Construction General Permit). As part of this process, the Authority would be required to comply with the NPDES Construction General Permit. Compliance with this permit would require the preparation and implementation of a SWPPP that would identify pollutant sources that may affect the quality of storm water discharge and implement BMPs, such as erosion control and pollution prevention measures, to be used during the course of construction. The project SWPPP would include BMPs to minimize the impacts of construction activities to water quality. With implementation of the BMP requirements required by the state Construction General Permit, the potential for pollutants and sediment to affect the water quality of runoff from construction sites would be minimized to less-than-significant levels. As described in Section 3.9, *Hazards and Hazardous Materials*, the transport, use, and disposal of pesticides associated with past, present and future agricultural activities would continue to be done in accordance with applicable regulatory requirements in order to protect water quality and public health (see *California Department of Pesticide Regulation* in Section 3.10.2, *Regulatory Setting*). As done already at the Rosedale active recharge basins, construction of the recharge basins at the Phase 1 and Phase 2 areas would involve scraping/excavating surface soils to create and maintain berms, such that the recharge basin floors are below grade. Any residual pesticides in the surface soils of former agricultural areas would be scraped off the recharge basin floor. The potential for residual pesticides to be transported to the groundwater by the recharge water would be minimal since the surface soils would be scrapped from the basin floors. **Mitigation Measure HAZ-1** would require that samples of soils at new recharge basins are analyzed and removed in accordance with all applicable federal and state regulations if soils contain hazardous quantities of contaminants. Therefore, impacts to water quality would be considered less than significant with mitigation.

Operation

Recharge water for the proposed project would be secured and acquired from various surface water sources, consisting of surplus surface water from the SWP, the CVP, appropriative water rights, and other available water, as described in Section 2.4, *Description of the Proposed Project, Recharge Water Supplies*. When available, this recharge water would be placed in recharge basins and allowed to infiltrate into the underlying aquifer for later recovery.

As discussed above in Section 3.10.1, *Environmental Setting, Surface Water Quality,* and *Groundwater Quality*, the quality of typical surface water sources and groundwater in the aquifer beneath the project area has been characterized through laboratory analysis and compared with drinking water parameters. The water quality of the surface water sources for groundwater banking is in general lower in constituent concentrations than that of the local groundwater. The introduction of surface water into the shallow zone would improve groundwater quality, as it has been shown to occur for the neighboring Strand Ranch project (THC 2015). In addition, as the water placed in the recharge basins infiltrates through the soil column down to the aquifer, the water quality would be anticipated to further improve because the soil would filter out some of the chemical constituents. Consequently, the recharge of surface water would improve the groundwater quality, resulting in a beneficial impact.

Once recovered, the groundwater would be introduced into the new proposed conveyance facilities, California Aqueduct, Goose Lake Channel, or the CVC through the Rosedale West Intake Canal and would be subject to applicable pump-in water quality requirements. The

Authority will enter into an agreement with DWR for a new turnout into the California Aqueduct that will include water quality requirements for discharging non-SWP water into the California Aqueduct. Prior to pumping extracted groundwater into the CVC and California Aqueduct, it would be the Authority's responsibility to ensure that the water quality was sufficient to meet applicable water quality requirements and submit a Pump-In Proposal that identifies the water sources, planned operation, inflow water quality, and any anticipated impacts to water quality and/or operations. Any water that did not meet water quality requirements or could not be blended to meet such requirements, as imposed by the conveyance facility operators, would not be conveyed within the canals. Based on preliminary sampling results, the underlying groundwater is mostly within drinking water standards, and the only constituents that were found to be above the drinking water MCLs were gross alpha, TCP, and arsenic, which are a known regional issue. However, the gross alpha concentrations detected were not substantially above the MCL of 15 pi/L and the underlying groundwater quality would likely benefit from the high quality surface water used for recharging (THC 2015). In addition, and as previously discussed in Section 3.10.1, *Environmental Setting, Project Area Groundwater Quality*, arsenic concentrations in the deeper portions of the aquifer are above the MCL in some areas. The proposed recharge water does not have elevated concentrations of arsenic and its addition would be expected to reduce the concentrations of arsenic in the deeper portions of the aquifer. Therefore, the addition of the recharge water would be a beneficial impact to groundwater quality. Less is known about extent of 1,2,3-TCP in the regional aquifer. With the recent adoption in 2017 of a MCL for 1,2,3-TCP, banking projects and water purveyors continue to learn the extent and mitigation techniques to best manage the contaminant. As stated above, water extracted for the proposed project purposes will meet applicable requirements for water quality. The proposed recharge water would not have elevated concentrations of 1,2,3-TCP.

As described in Chapter 3.9, *Hazards and Hazardous Materials*, the transport, use, and disposal of pesticides associated with past, present and future agricultural activities at the proposed recharge basins would continue to be done in accordance with applicable regulatory requirements in order to protect water quality and public health (see California Department of Pesticide Regulation in Section 3.10.2, *Regulatory Setting*). Future agricultural activities at the recharge basins would be subject to all applicable regulatory requirements of the USEPA, CDPR, and the Kern CAC. Farming operations at the proposed recharge basins could include the use of restricted or unrestricted materials, including pesticides that are listed in 3 *CCR* Section 6800(a) and/or 6800(b). The Authority would require all contract farmers to comply with regulations pertaining to application of pesticides within recharge basins and in proximity to wellheads. Section 6800(a) pesticides would be restricted from application on the Stockdale Properties. Section 6800(b) pesticides could be used within the recharge basins without restriction, also in accordance with CDPR regulations. All required measures pertaining to wellhead protection also would be implemented, such as prohibiting mixing, loading, spraying, storage of pesticides within 100 feet of an unprotected wellhead, and prohibiting application of pre-emergent herbicides from the 6800(a) and 6800(b) lists between the berm and the wellhead of a protected wellhead.

The Authority would require the contract farmer to obtain a permit from the CAC for application of restricted materials and to comply with all conditions of the permit in order to ensure the protection of human health and the environment. The contract farmer also would be required to

notify the CAC 24 hours prior to application of any restricted materials on the Kern Fan project properties The contract farmer would be required to inform the Authority and the CAC in the event of any accidental spill or inappropriate application of pesticides onsite. The contract farmer would be required to remediate completely and dispose of properly all contaminated soil to prevent the transport of pesticides into the groundwater and protect public health. Compliance with regulatory requirements pertaining to pesticide use would ensure impacts would be less than significant.

Mitigation Measures

Implement Mitigation Measure HAZ-1 (see Section 3.9, *Hazards and Hazardous Materials*).

Significance Conclusion

Less than Significant Impact with Mitigation

Groundwater Supplies

Impact 3.10-2: 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. (*Less Than Significant Impact*)

Construction

Until the proposed project is constructed, there would be no water recharge or recovery, and no addition of impervious surfaces. Therefore, relative to groundwater supplies and recharge during construction, there would be no impact.

Operations

The proposed project would affect existing groundwater levels through proposed water recharge and recovery activities. During periods when surface water is available for artificial recharge, water would be delivered to the proposed recharge basins for infiltration and storage underground. Following recharge activities, stored groundwater would be pumped out and delivered for offsite water usage. Recovery would be limited to the amount previously recharged less losses, up to 50,000 AFY. The MOUs define recharge losses as amounts of water that are non-bankable and non-recoverable that provide a benefit by increasing the volume of water into groundwater storage and supporting sustainability.

As discussed above in *Methodology, Groundwater Modeling*, a groundwater analysis was conducted for the proposed project to estimate the potential effects of the proposed recharge and recovery operations on groundwater levels (THC 2020b). Although specific sites have not been identified for the proposed recharge and recovery facilities, representative locations were identified for recharge basins and recovery wells, in and around the proposed Phase 1 and Phase 2 areas, for purposes of estimating the impacts of project operations to groundwater (see **Figure 3.10-7**). The representative area includes 1,300 acres of recharge basins and 12 recovery wells.

Groundwater Recharge Operations

During periods of higher groundwater levels, underground structures such as support structures of the Eastside Canal, CVC or other sub-surface infrastructure could be damaged by upward pressure caused by rising groundwater. Mounding groundwater resulting from recharging on the project sites could impact the integrity of these structures or cause cracks in sub-surface concrete panels.

As discussed above in the section on *Methodology, Groundwater Modeling*, groundwater modeling conducted for the proposed project evaluated the effects that proposed recharge would have during times of relatively high baseline groundwater levels, simulated using relatively high groundwater conditions of December 2012 (THC 2020b). The maximum mounding would occur in the Shallow/Intermediate Aquifers with lesser mounding projected in the Deep Aquifer. As illustrated on Figure 3.10-6, groundwater mounding would occur during recharge operations mostly beneath the three recharge basins, with the maximum mounding occurring beneath the central recharge basin. Groundwater mounding beneath the central recharge pond could rise to within 64.1 feet of the ground surface; groundwater mounding in areas away from the recharge basins and in the Shallow/Intermediate and Deep Aquifers would be less and would not rise as close to the ground surface. Therefore, because groundwater mounding would not raise groundwater levels in any area to less than 50 feet from the ground surface, the project would not cause damage to surface and underground structures due to pressure or liquefaction. Groundwater mounding further away from the recharge basins and outside of the project site would be much less, on the order of less than 10 feet. The impact relative to recharge operations would be less than significant.

Groundwater Recovery Operations

During periods of lower groundwater levels, the pumping of groundwater to recover stored water could decrease groundwater levels to below the Minimum Thresholds established in the GSP or trigger levels established in the Operating Plans. This could damage project and nearby wells if the groundwater levels decreased below existing well pumps.

As discussed above in the section on *Methodology, Groundwater Modeling*, groundwater modeling conducted for the proposed project evaluated the effects of groundwater recovery operations during relatively low groundwater conditions, such as 2015 and 2016. As shown on Figure 3.10-7, groundwater levels would decrease to below baseline conditions for a brief time period but then recover to baseline conditions within 2 years.

To further evaluate the effects of groundwater recovery, the groundwater model compared the lowest projected groundwater levels to the Minimum Thresholds on the baseline condition hydrographs for 2000 thru 2018 in both the Intermediate and Deep Aquifers for the Rosedale monitoring wells. Figures 3.10-8 and 3.10-9 compare the Minimum Thresholds to the anticipated deepest level of groundwater drawdown in the Intermediate and Deep Aquifers, respectively. The deepest projected groundwater levels during maximum pumping in the Intermediate Aquifer are not expected to fall below the Minimum Thresholds at the Rosedale monitoring wells, although groundwater levels immediately west of the western basins and in between the central and eastern basins could approach the Minimum Thresholds during recovery of stored water. The deepest

projected groundwater drawdown levels in the Deep Aquifer during maximum pumping slightly exceed the Minimum Threshold at the westernmost Rosedale Monitoring Well #4 and are at the Minimum Threshold at Monitoring Well #6 between the central and eastern recharge basins. Groundwater levels would be expected to recover to above the minimum thresholds once recovery pumping is completed. Projected project-related groundwater levels in the other Deep Aquifer wells do not reach the Minimum Thresholds. Therefore, impacts relative to recovery operations would be less than significant.

The groundwater model run also evaluated the drawdown that would occur if the nearby DRP and Stockdale Integrated Banking Project were also concurrently recovering stored water. The effects of combined groundwater drawdown on nearby wells would be additive and are shown for wells in the Intermediate and Deep Aquifers on Figures 3.10-10 and 3.10-11, respectively. As shown, the maximum cumulative drawdowns that would occur in the Intermediate Aquifer range from 2.5 feet at Kern Water Bank Well 30S/25E-06K01 to 19.9 feet at Well 29S/24E-28A61 in the northern portion of the Phase 2 area. The maximum cumulative drawdowns that would occur in the Deep Aquifer range from 9.3 feet at the BVWSD Well west of the west recharge basin to 52.7 feet at Rosedale's Well WB-1 in between the central and east recharge basins. This cumulative well drawdown would only occur in the event that all three groundwater banking projects were recovering stored water at the same time. Given the existing seasonal groundwater level fluctuations in the region that are on the order of 200 or more feet, this amount of fluctuation is not expected to expose and damage well pumps. In addition, the largest cumulative drawdown would only occur in Rosedale's well; cumulative drawdown further away from the recharge basins and outside of the project site would be much less, on the order of less than 20 feet.

The Long Term Operations Plan considers that project-related decreases in groundwater levels that are 30 feet or greater relative to baseline conditions are considered negative project impacts that trigger mitigation if neighboring wells experience mechanical failure or other operational problems due to declining water levels. Given historical fluctuations in groundwater levels in the area when other nearby groundwater banking projects are recovering, it is expected that additional declines attributable to the proposed project beyond historic low groundwater levels could result in operational problems at some existing wells. However, the proposed project would not be anticipated to result in declines of groundwater levels greater than 20 feet at neighboring existing wells. Therefore, no mitigation would be required and, impacts relative to recovery operations would be less than significant.

Sustainable Groundwater Management

The proposed project is one of many projects proposed by Rosedale, as part of the Kern Groundwater Authority and its GSP, for implementation in its management area of the GSA. As such, the proposed project would assist Rosedale (and by extension the Kern Groundwater Authority) with the stabilization of groundwater levels and help achieve groundwater sustainability in the Kern Fan area by the SGMA-mandated date of 2040 (GEI 2019; Rosedale 2019). As previously discussed, the Sub-basin is currently experiencing a storage deficit of about 12,600 AFY (THC 2019). Depending on the availability of surface water, the proposed project could recharge upwards of 100,000 AFY.

From an operational perspective, Rosedale has committed to the agreements included in Appendix B, which include Rosedale's MOUs with adjoining entities in the Kern Fan area and the complementary Operations Plans. The proposed project would be incorporated into the MOUs and Operations Plans. The MOUs define recharge losses as amounts of water that are non-bankable and non-recoverable that provide a benefit by increasing the volume of water in groundwater storage and supporting sustainability. As summarized in Chapter 1, *Introduction*, and above in *Methodology, Rosedale Operating Plans*, the Long Term Operations Plan and the Project Recovery Operations Plans (collectively "Operations Plans") have resulted in establishing a monitoring program that includes groundwater level monitoring. The Operations Plans designate specific measures to be employed to "prevent, eliminate or mitigate significant adverse impacts" resulting from project operations, including effects to neighboring wells. The Operations Plans includes monitoring of groundwater conditions and the use of Rosedale's groundwater model to predict the contribution of the various banking projects to groundwater increases or declines in the area. The Operations Plans define when such "Project Conditions" constitute a negative project impact (NPI) relative to "No-Project Conditions." The Operations Plans also establishes the NPI that would trigger implementation of mitigation measures, such as when the groundwater model predicts groundwater levels that would result in mechanical failure or other operational problems at neighboring wells. The Operations Plans include mitigation measures to be implemented for different categories of wells, such as providing compensation to lower the well pump; reducing or adjusting pumping to prevent, avoid, or eliminate the NPI; or drilling a new well. Implementation of the Operations Plans would ensure that local groundwater users and neighboring well owners/operators to the proposed recharge and recovery facilities would not be adversely affected during operation of the proposed recovery wells. The Operations Plans would ensure that any lowering of localized groundwater levels within a cone of depression around the proposed recovery wells would not have adverse effects to the operation of neighboring wells. Therefore, the proposed project would not have adverse localized effects to groundwater supplies and would support sustainable groundwater management of the basin. Impacts would be less than significant.

Mitigation Measures

None Required

Significance Conclusion

Less than Significant Impact

Erosion and Flooding

Impact 3.10-3: The proposed project would substantially alter the existing drainage pattern of the project area but would not result in: substantial erosion, siltation, or flooding on-or offsite; create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage; or impede or redirect flood flows. (*Less than Significant Impact*)

Construction

Construction of the proposed project would require excavation, grading and recontouring of soils at the project areas. During these activities, soils could be become exposed to high winds or heavy precipitation causing erosion. As discussed above in Impact 3.10-1, the proposed project would disturb more than one acre, and therefore would be required to comply with the NPDES Construction General Permit, which would require the preparation and implementation of a SWPPP. The SWPPP would describe BMPs describing erosion control and pollution prevention measures to be used during the course of construction. The project SWPPP would include BMPs to minimize the impacts of construction to a less than significant level. Erosion control BMPs have been proven effective at minimizing erosion during construction and associated earthwork activities. With implementation of the SWPPP, the project would minimize the potential for erosion or siltation to occur during construction, and the impact would be less than significant.

Operation

The proposed project would be designed to provide infiltration of surface water within the proposed recharge basins within the project area. Storm water runoff would be captured onsite and therefore would not cause or exacerbate any potential flooding on- or off-site. The proposed conveyance canal would not cross or alter any drainages. The conveyance pipelines would be underground, and once installed there would be no change in surface runoff. Pump stations would have a minimal footprint surrounded by pervious soil into which precipitation would infiltrate, as it does now. Therefore, there would be no impact regarding flooding due to altering the existing drainage pattern of the project area.

The proposed project would not create or contribute new sources of runoff or polluted runoff. The proposed project would be designed to provide infiltration of surface waters within the recharge basins at the project area and as such would capture storm water runoff onsite. No drainage system would be necessary for storm water capture. The Kern Fan Conveyance Facilities would consist of some combination of a canal or pipelines, none of which would require the use of any drainage system. Therefore, there would be no impact in regards to exceeding the capacity of drainage systems within the project area.

The proposed project would construct recharge basins, which would also capture storm water during precipitation events. Although the drainage pattern would be altered in the immediate location of the recharge basins, the basins would not cause substantial erosion or siltation on- or off-site because rainwater would be contained within the basins. The basins also would continue to be used for agricultural purposes when not being used for recharge. Thus, with the continuation of farming, grazing, or fallowing, the existing land cover would not be substantially altered from existing conditions and would not alter the conditions that affect erosion or siltation. The

conveyance canal and/or pipelines would not alter the overall drainage pattern within their alignments. Pipelines would be below ground and would not alter existing topography or drainage once construction is complete. Canals would contain rainwater, similar to recharge basins, and would be constructed as gravity flow structures to the extent feasible, aligned with the existing topography. The pump stations would have relatively small footprints. Precipitation falling on the pump stations would flow off to the surrounding unpaved soils and infiltrate into the ground, as it does now. Therefore, the addition of the recharge basins, canal, pipelines, and pump stations would not substantially alter the existing drainage pattern of the project area site and would not result in substantial erosion or siltation on- or off-site, resulting in a less than significant impact.

Mitigation Measures

None Required

Significance Conclusion

Less than Significant Impact

Flood Hazard from Seiche, Tsunami, and Inundation by Dam Failure

Impact 3.10-4: The proposed project would not risk the release of pollutants due to project inundation in a flood hazard, tsunami, seiche or dam failure flood zone. (*Less than Significant Impact*)

The proposed project is not located within a FEMA-designated 100-year flood zone and does not include the construction or renovation of any housing units. The perimeter berms of the recharge basins would be compacted and constructed to minimize any potential damage that may occur from the filling of the basins. In the event that damage occurs to the berms during times when the ponds are full, released water would infiltrate into the permeable soils that comprise the relatively flat area surrounding the recharge ponds. Therefore, there would be no impact to people or structures related to potential risk of loss, injury or death involving inundation in a flood hazard zone.

The project area is not located in an area that is susceptible to the effects of a seiche or tsunami. Therefore, there would be no impact to people or structures related to potential risk of loss, injury or death involving inundation by a seiche or tsunami.

Until the proposed project is constructed, there would be no potential for inundation from a dam failure, and there would be no impact.

As discussed above in *Project Setting, Flooding*, in the event of a failure of the dam at Lake Isabella, the Phase 1 area would be located within the distal end of the inundation zone. The eastern portion of the Phase 1 area could be flooded with 0 to 5 feet of reservoir water in 14 to 24 hours. However, the flood waters would have slowed by the time they reach the Phase 1 area and would have lost velocity, reducing the potential for damage. In addition, the flood waters would be shallow relative to the heights of the recharge basin berms, further reducing the potential for damage. Finally, the flood waters would consist of surface water that would not be expected to

contain pollutants other than entrained sediment. As previously noted, by the time the inundation flood waters reach the Phase 1 area, the flow velocity would have decreased and sediment load would be dropped out. The addition of the proposed recharge and recovery facilities would not introduce new land uses to the project area, relative to existing conditions, that would result in the introduction of new pollutants during potential inundation by flood waters. The inundation flood waters would not reach the Phase 2 area or the Kern Fan Conveyance Facilities area.

In the unlikely event of a failure of the dam at Lake Isabella, the distance from the dam to the Phase 1 project area would reduce the potential for damage. Any damage to the recharge basin berms could be easily repaired. Impacts relative to flooding by inundation from the failure of the Lake Isabella dam would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Water Quality Control Plan or Sustainable Groundwater Management Plan

Impact 3.10-5: The proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. (*Beneficial Impact*)

Construction

Until the proposed project is constructed, there would be no conflicts or obstructions to the water quality control plan (basin plan) or sustainable groundwater management plan, and there would be no impact.

Operation

As discussed in Chapter 2, *Project Description*, the purpose of the proposed project is to augment the recharge, storage, and recovery capabilities of existing water supply programs and provide greater operational flexibility. By storing additional surface water underground in Kern County, the proposed project would generally benefit groundwater levels and storage in the Sub-basin and help support groundwater sustainability efforts required by SGMA. In addition, the proposed project would enhance water supply reliability by augmenting supplies for periods when other sources may be limited or unavailable. Additional details regarding impacts to water quality and water supplies are analyzed above in Impacts 3.10-1 and 3.10-2, respectively. Therefore, relative to the water quality control plan (basin plan) and the sustainable groundwater management plan, the proposed project would have a beneficial impact.

Mitigation Measures

None Required

Significance Determination

Beneficial Impact

Cumulative Impacts

Impact 3.10-6: Concurrent construction and operation of the proposed project and related projects in the geographic scope would not result in cumulative short-term and long-term impacts to hydrology and water quality. (Less than Significant Impact)

This section presents an analysis of the cumulative effects of the proposed project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts.

As previously discussed, the proposed project would have no impact with respect to altered drainages, drainage system capacities, impeding flood flow in flood hazard zones, seiches, and tsunamis. Accordingly, the proposed project could not contribute to cumulative impacts related to these topics and are not discussed further.

The geographic area affected by the proposed project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative hydrology and water quality impacts encompasses the Sub-basin. The timeframe during which proposed project could contribute to cumulative hydrology and water quality impacts includes the construction and operations phases. For the proposed project, the operations phase is permanent.

Significant cumulative impacts related to hydrology and water quality impacts could occur if the incremental impacts of the proposed project combined with the incremental impacts of one or more of the cumulative projects identified in Table 3-2 and shown on Figure 3-1 to substantially increase risk that people or the environment would be exposed to hydrology and water quality impacts. Cumulative Projects numbers 1 and 2 are road improvement projects. Cumulative Projects number 3 through 10, 12, and 13 are water supply improvement projects, similar to the proposed project that include recharge basins, recovery wells, pipelines, and/or canals, and associated infrastructure. Cumulative Project number 11 is a maintenance project that would raise portions of existing concrete liners and would not have any impacts relative to water quality of supply. Table 3-1 lists the groundwater banking programs in Kern County. The groundwater banking programs would have routine banking activities (i.e., recharge and recovery) that could result in cumulative impacts.

Construction

Similar to the proposed project, the cumulative projects have the potential to disturb more than one acre. If the projects are constructed at the same time, the erosion effects could be cumulatively significant and could affect water quality of nearby surface water bodies. However, the state Construction General Permit would require each project to prepare and implement a SWPPP. The SWPPPs would describe BMPs to control runoff and prevent erosion for each project. Through compliance with this requirement, the potential for erosion impacts would be

reduced. The Construction General Permit has been developed to address cumulative conditions arising from construction throughout the state, and is intended to maintain cumulative effects of projects subject to this requirement below levels that would be considered significant. For example, two adjacent construction sites would be required to implement BMPs to reduce and control the release of sediment and/or other pollutants in any runoff leaving their respective sites. The runoff water from both sites would be required to achieve the same action levels, measured as a maximum amount of sediment or pollutant allowed per unit volume of runoff water. Thus, even if the runoff waters were to combine after leaving the sites, the sediments and/or pollutants in the combined runoff would still be at concentrations (amount of sediment or pollutants per volume of runoff water) below action levels and would not be cumulatively considerable. Impacts would be less than significant.

Operations

Once constructed, the road improvements for Cumulative Projects numbers 1 and 2, and the concrete liner maintenance project for Cumulative Project number 11 would be complete and could no longer affect water quality.

Once operational, the cumulative water supply improvement projects (i.e., Cumulative Projects 3 through 10, 12, and 13) would be subject to the same regulations and similar agreements as the proposed project relative to water quality. Similar to the proposed project, the water quality of the surface source waters would generally be better than the water quality of groundwater in the aquifer, and the recharge of surface water into the aquifer would improve groundwater quality. Once recovered, groundwater would be subject to the pump-in water quality requirements of regional water conveyance systems, similar to the proposed project. Any water that did not meet water quality requirements or could not be blended to meet such requirements, would not be conveyed within the California Aqueduct and the CVC.

Similar to the proposed project, the cumulative water supply improvement projects would be subject to the same regulations and similar agreements as the proposed project relative to water supply and groundwater levels. Similar to the proposed project, recharge and recovery operations would be subject to operating plans, MOUs, and other agreements that would require the establishment of groundwater level monitoring programs in wells at and around each of the banking operations.

The proposed project would be operated subject to Rosedale's Operations Plans, as described previously. The Operations Plans designate specific measures to be employed to "prevent, eliminate or mitigate significant adverse impacts" resulting from project operations, including effects to neighboring wells. The Operations Plans includes monitoring of groundwater conditions and the use of Rosedale's groundwater model to predict the contribution of the various banking projects to groundwater increases or declines in the area. Consequently, the proposed project would be operated in such a way as to prevent cumulative impacts with neighboring water banking operations. Implementation of the Operations Plans would ensure that local groundwater users and neighboring well owners/operators to the proposed recharge and recovery facilities would not be adversely affected during operation of the proposed recovery wells. Therefore, the proposed project would not have adverse localized effects to groundwater supplies and would support sustainable groundwater management of the basin. With implementation of Rosedale's

Operations Plans, the proposed project would be in compliance with SGMA and other regulations, MOUs, and agreements and would not have a cumulatively considerable impact to groundwater supplies or sustainable groundwater management of the basin. Impacts would be less than significant.

Similar to the proposed project, cumulative projects that allow farming in unused recharge basins would be required to transport, use, and dispose of pesticides in accordance with applicable regulatory requirements in order to protect water quality and public health. Compliance with regulatory requirements pertaining to pesticide use would ensure cumulative impacts would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

3.10.4 References

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U.S. Army Corps of Engineers, 2017. Draft Map, *Anticipated areas to flood in unlikely failure of Isabella Dam*. Accessed on July 22, 2020, at https://www.bakersfield.com/anticipated-areas-to-flood-in-unlikely-failure-of-isabella-dam/pdf_804257c6-3a0c-54aa-a8b0-c8feb01b5631.html

3.11 Land Use and Planning

This section addresses the potential impacts related to land use and planning associated with implementation of the proposed project. This section includes: a description of existing land uses in and around the project area; a summary of applicable regulations related to land use and planning; and an evaluation of the potential for the proposed project to result in environmental impacts related to land use and planning. In addition, an evaluation of the potential cumulative impacts is included.

3.11.1 Environmental Setting

Project Vicinity

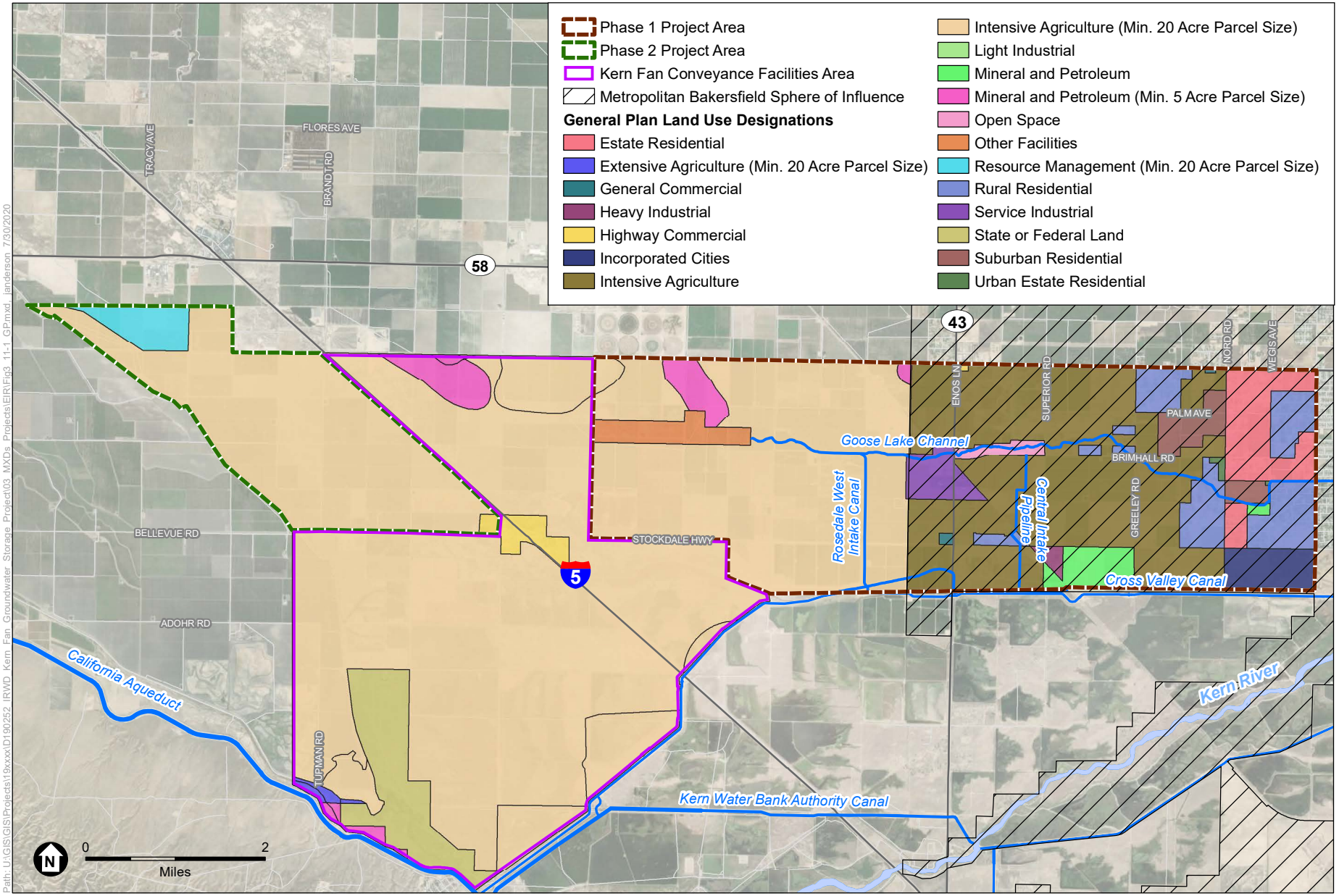
The proposed project is located immediately west of the City of Bakersfield, northwest of the Kern River and northeast of the California Aqueduct. The proposed project area is intersected by Interstate 5 and Highway 43. Land use in the vicinity of the project area is dominated by agriculture and open space, but also includes groundwater recharge activities, mineral and petroleum extraction, industrial land uses, and scattered rural residences as illustrated in **Figure 3.11-1**, which shows the location of the project and the land use designations for the area as provided by the Kern County General Plan.

Existing Land Use Designations

Land uses within the project area are provided by the Kern County General Plan and the Metropolitan Bakersfield General Plan. As stated above, all land use designations within the project area are shown in Figure 3.11-1, and the specific land uses in each portion of the project area are discussed below.

Phase 1 Project Area

The Phase 1 area is, like the surrounding area, dominated by agriculture. The majority of the project area has land use designations as provided by the Kern County General Plan of either Intensive Agriculture or Intensive Agriculture with a Minimum 20-Acre Parcel Size. However, the eastern portion of the Phase 1 project area that lies closer to and partially within the City of Bakersfield contains a greater diversity of land uses. Figure 3.11-1 shows the Kern County General Plan Land Use Designations (2009) for the proposed project area. Land uses at the Phase 1 project area are as follows: Estate Residential, Extensive Agriculture (Min. 20 Acre Parcel Size), General Commercial, Heavy Industrial, Highway Commercial, Incorporated Cities, Intensive Agriculture, Intensive Agriculture (Min. 20 Acre Parcel Size), Intensive Agriculture (Min. 20 Acre Parcel Size), Light Industrial, Mineral and Petroleum, Mineral and Petroleum (Min. 5 Acre Parcel Size), Open Space, Other Facilities, Rural Residential, Service Industrial, Suburban Residential, Urban Estate Residential.



SOURCE: ESRI; Kern County

Kern Fan Groundwater Storage Project

Figure 3.11-1

General Plan Land Use Designations

ESA

Phase 2 Project Area

Similar to the Phase 1 project area the Phase 2 project area consists largely of Intensive Agriculture with a minimum 20-acre parcel size land use designation. There are only two portions of this project area that are not Intensive Agriculture. The northernmost portion of the proposed project area is designated as Resource Management with a minimum 20-acre parcel size and the southeastern most tip of the Phase 2 project area is designated as highway commercial, located directly adjacent to Interstate 5.

Kern Fan Conveyance Facilities

The area where the Kern Fan Conveyance Facilities would be located is dominated by a land use of Intensive Agriculture (Minimum 20-Acre Parcel Size). As shown in Figure 3.11-1, other land use designations present within the conveyance facility area include State or federal land, Extensive Agriculture (Minimum 20-Acre Parcel Size), and Mineral and Petroleum (Minimum 5-Acre Parcel Size).

Surrounding Land Uses

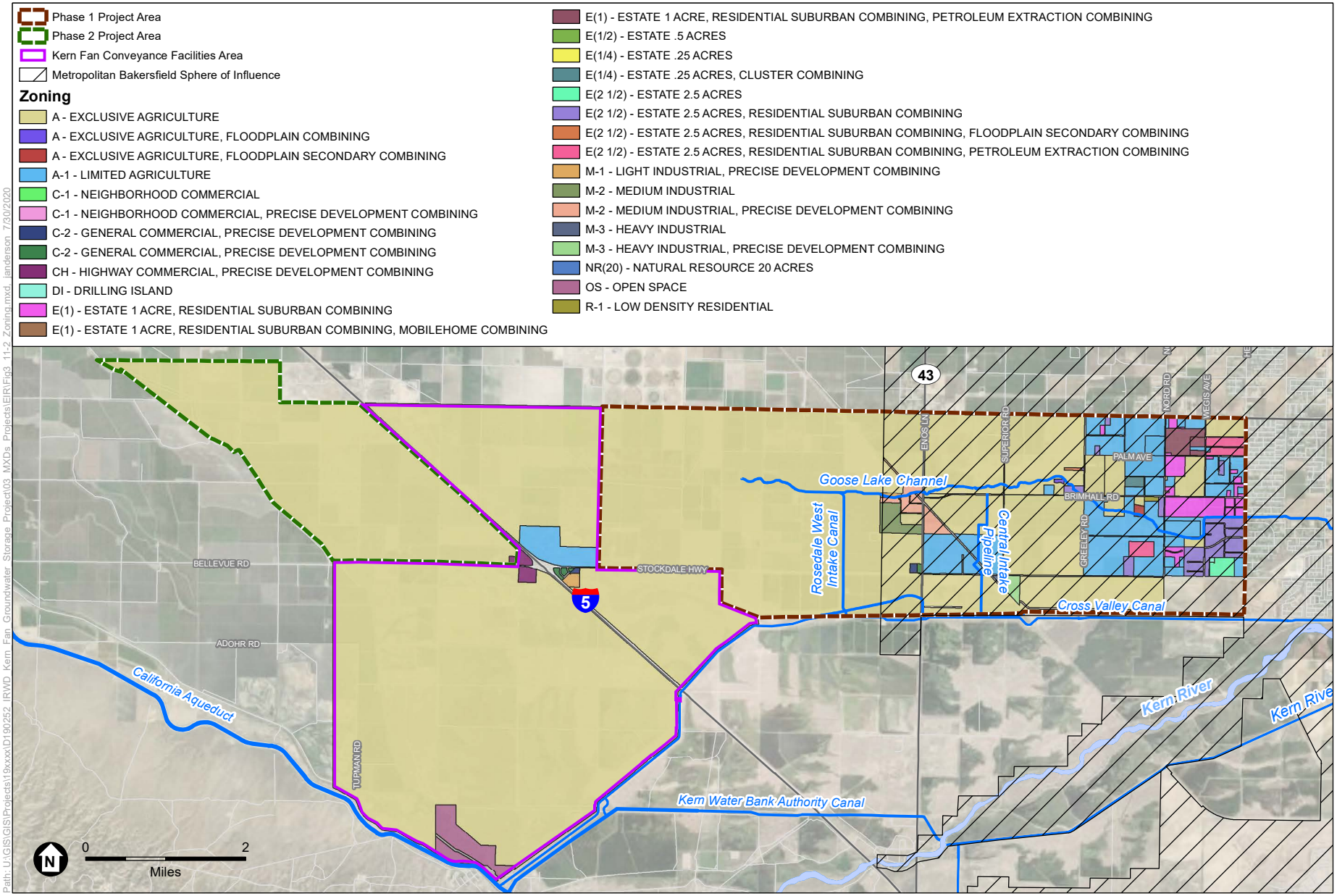
Kern County General Plan land use designations of surrounding properties include Intensive Agriculture, various forms of residential and estate. The City of Bakersfield General Plan provides the land uses for the portions of the proposed project within the City's limits. Actual land use in the project area is characterized by agriculture, rural residential, mineral extraction, and light industrial and commercial activity.

Existing Zoning Designations

The zoning categories set forth in the County General Plan are implemented through the County Zoning Ordinance. The zoning for the project area is largely dominated by Exclusive Agriculture and other agricultural zoning designations as described below and shown in **Figure 3.11-2**.

Phase 1 Project Area

While the western portion of the project area is largely zoned as A (Exclusive Agriculture) the eastern portion of the Phase 1 project area is within the zone of influence of the City of Bakersfield and as such, contains a wider array of zoning designations that are as follows: A (Exclusive Agriculture, Floodplain Combining), A (Exclusive Agriculture, Floodplain Secondary Combining, A-1 (Limited Agriculture), C-1 (Neighborhood Commercial), C-1 (Neighborhood Commercial, Precise Development Combining), C-2 (General Commercial, Precise Development Combining), DI (Drilling Island), E(1) (Estate 1-Acre, Residential Suburban Combining), E(1) (Estate 1-Acre, Residential Suburban Combining, Mobile Home Combining), E (1) (Estate One-Acre, Residential Suburban Combining, Petroleum Extraction Combining), E(1/2) (Estate 0.5- Acres), E(1/4) (Estate 0.25-Acres), E(1/4) (Estate 0.25-Acres, Cluster Combining), E(2 ½) (Estate 2.5-Acres), E (2 ½) (Estate 2.5-Acres, Residential Suburban Combining), E(2 ½) (Estate 2.5-Acres, Residential Suburban Combining, Floodplain Secondary Combining), E(2 ½) (Estate 2.5-Acres, Residential Suburban Combining, Petroleum Extraction Combining), M-1 (Light Industrial, Precise Development Combining), M-2 (Medium Industrial), M-2 (Medium Industrial, Precise Development Combining), M-3 (Heavy Industrial), M-3 (Heavy Industrial, Precise Development Combining), NR(20) (Natural Resource 20-Acres), OS (Open Space), and R-1 (Low Density Residential).



SOURCE: ESRI; Kern County

Kern Fan Groundwater Storage Project

Figure 3.11-2

Kern County Zoning Designations

ESA

Phase 2 Project Area

The Phase 2 project area, being located further away from the metropolitan area of Bakersfield, has a zoning designation that is almost entirely A (Exclusive Agriculture) with only small pockets of land with other zoning designations. The only other designation is a single parcel located in the southeast corner of the Phase 2 project area that is designated as CH (Commercial Highway).

Kern Fan Conveyance Facilities Area

Much like the Phase 2 Project Area, the Conveyance Facility Area is further away from the Bakersfield area and, in turn, also is almost entirely zoned as A (Exclusive Agriculture). Other zoning designations in the Conveyance Facilities Area includes A-1 (Limited Agriculture), C-2 (General Commercial, Precise Development Combining), CH (Highway Commercial, Precise Development Combining, M-1 (Light Industrial, Precise Development Combining), and OS (Open Space).

Surrounding Zoning Designations

Land surrounding the proposed project area is zoned by the County Zoning Ordinance as predominantly Exclusive Agricultural, Limited Agricultural, and Limited Estate

3.11.2 Regulatory Setting

State

California Planning and Zoning Law

The California Planning and Zoning Law requires each county and city to prepare and adopt "a comprehensive, long-term general plan for the physical development of the county or city" and of any land outside its boundaries which bears relation to its planning (*Government Code* Section 65300). Under current *Government Code* Section 65302, each General Plan must include the following elements: Land Use Element; Circulation Element; Housing Element; Conservation Element; Open Space Element; Noise Element; Safety Element; and Environmental Justice Element. *Government Code* Section 65302 also sets forth particular requirements that must be included in each of the eight elements. The California Governor's Office of Planning and Research (OPR) is statutorily required by *Government Code* Section 65040.2 to adopt and periodically revise the State General Plan Guidelines (GPG) for the preparation and content of general plans for all cities and counties in California. A general plan is the local government's long-term blueprint for the community's vision of future growth. The GPG serves as the "how to" resource for drafting a general plan. The GPG was last updated in 2017 (OPR 2017).

Local

Kern County General Plan

The Land Use, Open Space, and Conservation Element of the County General Plan (Kern County Planning Department 2009), adopted under the prior version of *Government Code* Section 65302, describes the following goals, policies, and implementation measure applicable to the proposed project:

Goal 1: Kern County residents and businesses should receive adequate and cost effective public services and facilities. The County will compare new urban development proposals and land use changes to the required public services and facilities needed for the proposed project.

Goal 5: Ensure that adequate supplies of quality (appropriate for intended use) water are available to residential, industrial, and agricultural users within Kern County.

Policy 35: Ensure that adequate water storage, treatment, and transmission facilities are constructed concurrently with planned growth.

Policy 39: Encourage the development of the County's groundwater supply to sustain and ensure water quality and quantity for existing users, planned growth, and maintenance of the natural environment.

Implementation Measure X: Encourage effective groundwater resource management for the long-term benefit of the County through the following:

- Promote groundwater recharge activities in various zone districts.
  - Support for the development of Urban Water Management Plans and promote Department of Water Resources grant funding for all water providers.
- Support the development of Groundwater Management Plans.
- Support the development of future sources of additional surface water and groundwater, including conjunctive use, recycled water, conservation, additional storage of surface water, and groundwater and desalination.

Kern County Zoning Ordinance

The zoning categories set forth in the County General Plan are implemented through the County Zoning Ordinance. The proposed project areas are currently zoned primarily as Exclusive Agriculture (A) and Limited Agriculture (A-1). According to Sections 19.12.020 and Section 19.14.020 of the County Zoning Ordinance, permitted uses for the Exclusive Agriculture and Limited Agriculture designations include water storage or groundwater recharge facilities. The proposed project is exempt from the County Zoning Ordinance per *Government Code* Section 53091(d), which states that the building and zoning ordinances "of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water…by a local agency."

Metropolitan Bakersfield General Plan

The project area is within the planning area of the Metropolitan Bakersfield General Plan (City of Bakersfield and Kern County 2007). The Land Use Element of the Bakersfield General Plan includes one goal and one implementation measure that are applicable to the proposed project:

Goal 3: Accommodate new development which is compatible with and complements existing land use.

Implementation Measure 7: Local guidelines for project processing shall reflect *CEQA Guidelines* which state that the environmental effects of a project must be taken into account as part of the project consideration.

Sustainable Groundwater Management Act of 2014

The Sustainable Groundwater Management Act of 2014 (SGMA), effective January 1, 2015, authorizes local agencies to manage groundwater in a sustainable manner and allows limited State intervention when necessary to protect groundwater resources. The SGMA requires the creation of a Groundwater Sustainability Agency (GSA) that would develop and implement a Groundwater Sustainability Plan to manage and use groundwater in a manner that can be maintained during the planning and implementation horizon without undesirable results, defined as follows:

(1) Chronic lowering of groundwater levels, indicating a significant and unreasonable depletion of supply;

(2) Significant and unreasonable reduction of groundwater storage;

(3) Significant and unreasonable seawater intrusion;

(4) Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies;

(5) Significant and unreasonable land subsidence that substantially interferes with surface land uses; or

(6) Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

The project area is located within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin (Basin No. 5-022.14), which is a high-priority basin. The Sub-basin includes 11 organized GSAs. Of these, six GSAs elected to be included in the GSP of the Kern Groundwater Authority, including Rosedale (RRBWSD 2019). The Kern Groundwater Authority, the designated local GSA, submitted its groundwater sustainability plan (GSP) on January 1, 2020 (KGA 2020).

The following basin sustainability goals related to groundwater supply reliability and protection of water quality were developed for the Kern Groundwater Authority GSP:

- Achieve sustainable groundwater management in the Kern County Sub-basin through the implementation of projects and management actions at the member agency level of each GSA.
- Maintain its groundwater use within the sustainable yield of the basin as demonstrated by monitoring and reporting groundwater conditions.
- Operate within the established sustainable management criteria, which are based on the collective technical information presented in the GSPs in the Sub-basin.
- Collectively bring the Sub-basin into sustainability and maintain sustainability over the implementation and planning horizon supplies are managed to optimize water supply reliability and minimize land subsidence.

3.11.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to land use and planning resources. The proposed project would have a significant impact if it would:

1. Physically divide an established community.
2. 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.
3. Result in cumulatively considerable impacts to land use.

Methodology

This environmental analysis of the potential impacts related to land use and planning is based on the following information: the definition of the proposed project provided above in Chapter 2 *Project Description*; a review of literature (public plans and maps); and the *Regulatory Framework* summarized above in Section 3.11.2. The existing conditions of the project area, as described above in Section 3.11.1, defines the baseline conditions for the impact analysis. The analysis of the potential effects of the proposed project on land use is discussed in the Impact Analysis provided below.

Impact Analysis

Divided Communities

Impact 3.11-1: The proposed project would not divide an established community. (*No Impact*)

The project area is located in an agricultural and rural residential community. Construction and operation of recharge basins and associated facilities in the project area would be consistent with existing community land use and would not serve to divide an established community.

The proposed recharge basins and recovery wells are anticipated to be constructed on land already used for agricultural purposes and once constructed would have roadways to allow access in and around the recharge basins. Dirt roads approximately 14 to 20 feet wide would run along the perimeter of and in between all basins to provide access to facilities during operation and maintenance activities. The proposed basins and recovery wells would not divide any established communities, and no impact would occur.

As a linear project feature, the Kern Fan Conveyance Facilities would be constructed so as to not divide existing roadways. Siphons would be installed when crossing Interstate-5, Stockdale Highway and other surface features, potentially such the East Side Canal and Kern Water Bank Main Canal (see Section 2.4.4). Additionally, where surface features exist, jack and bore methods would be used so that the conveyance facilities could tunnel under to avoid disruption. The proposed new turnout from the California Aqueduct would be constructed within the State of California right-of-way and subject to approval by DWR and KCWA. To avoid disruptions to the

California Aqueduct operations, cofferdams would be required during turnout construction. Cofferdams are temporary watertight structures that would allow for a portion of the Aqueduct to be dewatered during construction of the turnouts and allow flows to continue passing through the Aqueduct channel. The proposed Kern Fan Conveyance Facilities would not divide any established communities, and no impact would occur.

Mitigation Measures

None Required

Significance Determination

No Impact

Conflict with Land Use Plan, Policy or Regulation

Impact 3.11-2: The proposed project could cause a significant environmental impact due to a conflict with a County land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. (*Less than Significant Impact with Mitigation*)

Both the Phase 1 and Phase 2 project areas are largely designated as Intensive Agriculture and Rural Residential by the Kern County General Plan (Figure 3.11-1). The Intensive Agriculture designation allows for groundwater recharge facilities. The Phase 1 and Phase 2 areas are also largely zoned for Exclusive Agriculture and Limited Agriculture (Figure 3.11-2). The County Zoning Ordinance allows groundwater recharge facilities in Exclusive Agriculture. In addition, as discussed in Section 3.2, *Agriculture and Forestry Resources*, agricultural land uses, such as annual farming, grazing, or fallowing, would be allowed within the basins at all Kern Fan Project Property sites when the properties are not needed for water recharge or water management purposes. Grazing could be used to remove or control vegetative growth. The proposed project would be compatible with the goals and policies of the Kern County General Plan for protecting agricultural resources through the beneficial use of percolation basins and conveyance facilities. The Kern County's *Agricultural Preserve Standard Uniform Rules* state that groundwater recharge operations are compatible land uses on agricultural preserves if the preserve is used for commercial agriculture for at least seven months out of a twelve-month period (Kern County Planning Department 2009). For portions of the project area under a Williamson Act contract, implementation of **Mitigation Measure AGR-1** would be required to ensure consistency with land uses at those areas should the recharge basins be constructed there.

The area where the Kern Fan Conveyance Facilities would be located is dominated by a land use of Intensive Agriculture (Minimum 20-Acre Parcel Size). As shown in Figure 3.11-1, other land use designations present within the conveyance facility area include State or federal land, Extensive Agriculture (Minimum 20-Acre Parcel Size), and Mineral and Petroleum (Minimum 5-Acre Parcel Size). The Kern Fan Conveyance Facility area is almost entirely zoned as A (Exclusive Agriculture). Construction and operation of the Kern Fan Conveyance Facilities would require temporary and permanent easements across small portions of various properties along the

canal and/or pipeline alignment. The easements would not prevent the parcels from continuing to be used for agricultural use. Also, water conveyance facilities are considered to be compatible agricultural land uses according to Kern County's *Agricultural Preserve Standard Uniform Rules*, Kern County's General Plan Land Use designation of Intensive Agriculture, and Kern County's zoning designation for Exclusive Agriculture. Therefore, implementation of the proposed Kern Fan Conveyance Facilities would not conflict with designated land uses.

The proposed project is one of more than 150 projects and management actions in the Kern Groundwater Authority GSP (KGA 2020). The projects and management actions may be implemented as necessary to ensure the Kern County Sub-basin can achieve its sustainability goals, including maintaining groundwater use within the sustainable yield of the basin. The Kern Groundwater Authority GSP has concluded that under existing conditions, the Subbasin, as a whole, has an overdraft of 324,326 AFY, and within the KGA management area, the deficit is approximately 256,281 AFY (KGA 2020). With implementation of the projects and management actions in the GSP, during the implementation period of 2020 to 2040, the Kern County Sub-basin would have an average surplus of 85,578 AFY (KGA 2020). The proposed project would be consistent with, and would not conflict with, the local groundwater sustainability plan.

The proposed project would be compatible with the goals and policies of the Kern County General Plan for providing adequate supplies of quality water for residential, industrial, and agricultural users within Kern County, and effective groundwater resource management.

Additionally, the project area does reside within the Bakersfield Habitat Conservation Plan as well as the Kern Water Bank HCP/NCCP as discussed in Section 3.4, *Biological Resources.* As discussed in Impact 3.4-6, the implementation **Mitigation Measures BIO-10, BIO-11, and BIO-14** would reduce any potential impacts to less than significant levels.

As such impacts related to conflict with land use plans, policies or regulations with Kern County or other relevant agencies would be less than significant with the incorporation of the Mitigation Measures discussed above.

Mitigation Measures

Implement Mitigation Measures AGR-1, BIO-10, BIO-11 and BIO-14.

Significance Determination

Less than Significant Impact with Mitigation

Cumulative Impacts

Impact 3.11-3: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to land use and planning. (*Less than Significant Impact with Mitigation*)

This section presents an analysis of the cumulative effects of the proposed project in combination with other present and reasonably foreseeable future projects that could generate cumulatively considerable impacts to land use and planning.

The geographic area addressed in the discussion of cumulative impacts varies depending on the environmental resource topic being analyzed. The geographic area for the analysis of the potential cumulative impacts of the proposed project and cumulative projects related to land use and planning is limited to the San Joaquin Valley in Kern County.

The cumulative impact of the proposed project on land use and planning is dependent on the past, present, and reasonably-foreseeable future conditions of development and land use in the project vicinity. Other related projects in the area could result in the conflict with existing land use policies, plans, or divide the existing community. The projects to be considered cumulatively with this project are discussed in Table 3-2 and similar to the proposed project include groundwater recharge, conveyance, and banking projects. The impacts associated with these cumulative projects would be similar to those discussed above for the proposed project. As such, these projects could also result in the permanent change of land uses in the San Joaquin Valley that could conflict with land use plans and policies and divide established communities. Other projects discussed in Table 3-2 include road improvement projects led by the City of Bakersfield. These projects in conjunction with the proposed project could cumulatively contribute to impacts to land use and planning within the geographic scope defined above.

However, the proposed project would not contribute to any conflicts with land use designations with the implementation of the mitigation measures discussed above. Overall, the proposed project would provide benefits to agriculture and groundwater sustainability, and land uses in the project area would remain in agricultural use. Groundwater recharge and water conveyance facilities are compatible with agricultural land use in Kern County. As such the proposed project would not cumulatively contribute to impacts to land uses in the proposed project area.

Mitigation Measures

Implement Mitigation Measures AGR-1, BIO-10, BIO-11 and BIO-14.

Significance Determination

Less than Significant Impact with Mitigation

3.11.4 References

City of Bakersfield and Kern County 2007. Metropolitan Bakersfield General Plan. Available online at: https://psbweb.co.kern.ca.us/planning/pdfs/mbgp/mbgp_complete.pdf . Prepared December 11, 2007. Accessed July 28, 2020.

Kern County Planning Department, 2009. Kern County General Plan. Available online at: https://psbweb.co.kern.ca.us/planning/pdfs/kcgp/KCGP.pdf. Prepared September 22, 2009. Accessed on July 28, 2020.

Kern County, 2006. Agricultural Preserves Program Boundary Data. Available online at: https://drecp.databasin.org/maps/new#datasets=9c84704f1e564efe87ba22849e94eb3f. Accessed, July 28, 2020.

Kern Groundwater Authority (KGA), 2020. *Groundwater Sustainability Plan, Kern County, CA*. Prepared by GEI Consultants, January 2020.

3.12 Mineral Resources

This section addresses the potential impacts to mineral resources associated with implementation of the proposed project. This section includes: a description of the existing mineral resources in the project area; a summary of applicable regulations related to mineral resources; and an evaluation of the potential impacts of the proposed project related to mineral resources in and around the project area, including cumulative impacts.

3.12.1 Environmental Setting

Kern County is one of the richest oil-producing counties in the United States in which approximately 2,971 square miles of land in Kern County are classified as Mineral Resource Zones (MRZs) of varying significance. The valley floor area of Kern County and the surrounding lower elevations of the mountain ranges contain numerous deposits of oil and gas resources, a major economic resource for the County. Mineral resources in Kern County include numerous mining operations that extract a variety of materials, including sand and gravel, stone, gold, dimensional stone, limestone, clay, shale, gypsum, pumice, decorative rock, silica, and specialty sand. MRZs have been designated to indicate the significance of mineral deposits. The MRZ categories are as follows:

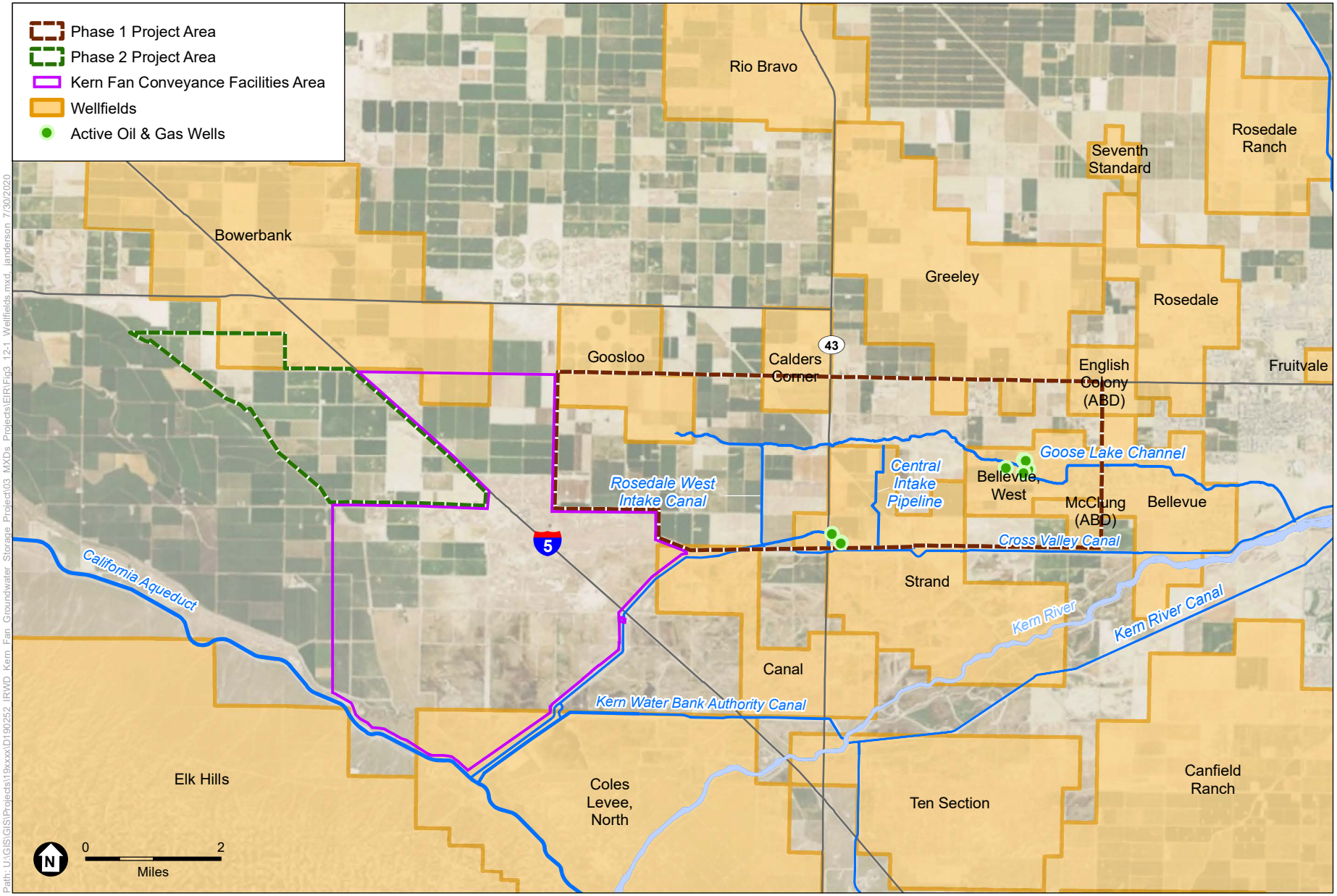
MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence.

MRZ-2: Areas where adequate information indicates significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.

MRZ-3: Areas containing mineral deposits the significance of which cannot be evaluated from available data.

MRZ-4: Areas where available information is inadequate for assignment to any other MRZ.

According to the *Update of Mineral Land Classification: Aggregate Materials in the Bakersfield Production-Consumption Region* there are no MRZs within the vicinity of the project area (DOC 2009). However, Kern County has been a major oil producer since the early 1900s; and there are a number of active oil and gas wellfields located within the project area (**Figure 3.12-1**). Strand, Greeley, Canal, Bellevue West, Bellevue, and McClung Oil Fields include wells within the project area that are active (CalGEM 2020, CalGEM 2002). Mineral rights associated with and underlying the project area are not owned the Authority.



SOURCE: Mapbox; Kern County; CDC, 2020.

Kern Fan Groundwater Storage Project

Figure 3.12-1

Existing Oil Fields in the Project Area

ESA

Sand and Gravel

Sand and gravel have been determined to be important resources for construction, development, and physical maintenance, from highways and bridges to swimming pools and playgrounds. The availability of sand and gravel affects construction costs, tax rates, and affordability of housing and commodities. The State of California has statutorily required the protection of sand and gravel operations. Because transportation costs are a significant portion of the cost of sand and gravel, the long-term availability of local sources of this resource is an important factor in maintaining the economic attractiveness of a community to residents, business, and industry. The major resources of sand and gravel in Kern County are in stream deposits along the eastern side of the San Joaquin Valley and in the Sierra Nevada foothills, and in alluvial fan deposits along the north flank of the San Emidio and Tehachapi Mountains at the southern end of the County. Most of the recent alluvium in the San Joaquin Valley floor is composed of sand used as a source of road base material (Kern County Planning Department 2004). A portion of recent alluvium deposited by the Kern River has been classified MRZ-2, but it is upstream and outside the boundaries of the project area. Kern River deposits south of the project area include sediments which are predominately fine-grained, and gravel does not occur in economic concentrations in the subsurface (Kern County Planning Department 1994; DOC 2009). Additionally, there are no sand and gravel extraction sites within the project area (City of Bakersfield and Kern County 2009).

3.12.2 Regulatory Setting

State

Geologic Energy Management Division

The Geologic Energy Management Divisions (CalGEM), formerly Division of Oil, Gas and Geothermal Resources (DOGGR), is a State agency responsible for protecting public health, safety, and the environment in its oversight of the oil, natural gas, and geothermal industries, while working to help California achieve its climate change and clean energy goals. CalGEM's regulatory program promotes the sensitive development of oil, natural gas, and geothermal resources in California through sound engineering practices, prevention of pollution, and implementation of public safety programs. To implement this regulatory program, CalGEM requires avoidance of building over or near plugged or abandoned oil and gas wells, or requires the remediation of wells to current CalGEM standards.

Surface Mining and Reclamation Act of 1975

The Surface Mining and Reclamation Act of 1975 requires the State Geologist to classify land into MRZs according to its known or inferred mineral potential. The primary goal of mineral land classification is to ensure that the mineral potential of land is recognized by local government decision-makers and considered before land-use decisions are made that could preclude mining.

Local

Kern County Code

The Kern County Code of Ordinances would require issuance of a well drilling permit prior to construction of proposed project wells (*Kern County Code*, Title 14, Chapter 14.08). Other permits, such as grading, construction, and building permits would not be required because the proposed water facilities are considered exempt under *Government Code* Section 53091.

Kern County General Plan

The proposed project is located within the planning area governed by the *Kern County General Plan* (County General Plan) (Kern County 2009). The Land Use, Open Space and Conservation Element of the Kern County General Plan provides goals, policies, and implementation measures that relate to the protection of important mineral, petroleum, and agricultural resources and ensures that development of resource areas minimize effects to neighboring resource lands. The General Plan also provides policies that emphasize conservation of identified mineral deposits, and protection of lands classified as MRZ-2. The goal, policies, and implementation measures applicable to the proposed project regarding mineral resources include:

Land Use, Conservation, and Open Space Element, Resource Section

Goal 2: Protect areas of important mineral, petroleum, and agricultural resource potential for future use.

Policy 14: Emphasize conservation and development of identified mineral deposits.

Implementation Measure H: Use the California Geological Survey's latest maps to locate mineral deposits until the regional and statewide importance mineral deposits map has been completed, as required by the Surface Mining and Reclamation Act.

Bakersfield General Plan

The proposed Phase 1 area is also located within the planning area governed by the *Metropolitan Bakersfield General Plan* (Bakersfield General Plan) (City of Bakersfield and Kern County 2002). Within the Mineral and Energy Resources Element of the Bakersfield General Plan, there are goals and policies that are applicable to the proposed project regarding mineral resources:

Mineral and Energy Resources Element

Goal 1: Protect areas of significant resource potential for future use.

Policy 5: Protect significant mineral and petroleum resource areas, including potential sand and gravel extraction areas.

3.12.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to mineral resources. The proposed project would have a significant impact if it would:

1. 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.
2. 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.
3. Result in cumulatively considerable impacts to mineral resources.

Methodology

The environmental analysis of the potential impacts related to mineral resources is based on a review of the definition of the proposed project provided above in Chapter 2, *Project Description*, and the baseline conditions described in 3.12.1, *Environmental Setting*, which is based on DOC and CalGEM literature and mapping, the Kern County General Plan, and the Bakersfield General Plan, all of which reflect the most up-to-date understanding of mineral resources in the vicinity of the project area.

The proposed project would be regulated by the various laws, regulations, and policies summarized above in Section 3.12.2, *Regulatory Setting*. Compliance of the proposed project with applicable federal, State, and local laws and regulations is assumed in this analysis and local and state agencies would be expected to continue to enforce applicable requirements. The environmental analysis below identifies if the defined significance thresholds are exceeded and, therefore, a significant impact would occur. For those impacts considered to be significant, mitigation measures are proposed to the extent feasible to reduce the identified impacts.

Impact Analysis

Mineral Resources of Value

Impact 3.12-1: The proposed project would not 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. (*Less than Significant Impact*)

The proposed project would include two phases of construction to implement recharge basin facilities and approximately 12 recovery wells on up to 1,300 acres of agricultural or vacant land. Additionally, the proposed project would involve construction of pipelines and/or canals, pump stations, and a new turnout at the California Aqueduct to convey water between the project facilities and the California Aqueduct. As described in Section 3.12.1, there are no MRZs located in the vicinity of the project. Therefore, the proposed project would not impact mineral resources of value to the region and residents of the State.

While there are a number of active oil and gas wellfields located within the project area as shown in Figure 3.12-1, the majority of the existing oil/gas wells have been plugged or cancelled as indicated by the California Department of Conservation CalGEM Well Finder GIS database (CalGEM 2020a). Active oil and gas wells within the project area are illustrated on Figure 3.9-1 within Section 3.9, *Hazards and Hazardous Materials,* of this Draft EIR. There are 6 currently active oil and gas wells within the Phase 1 area, two of which are located on Stockdale East, which is owned by Rosedale. Mineral rights associated with and underlying the project area are not owned the Authority. In the event that construction of the proposed project would occur within an active wellfield, the Authority would be required to accommodate existing and future drill islands in the project area to ensure that access to underlying mineral rights may continue during construction and operation of the proposed project. As a result, implementation of the proposed project would not impede future access to subsurface mineral resources of regional importance. Impacts would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Mineral Resource Recovery Sites

Impact 3.12-2: The proposed project would not result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. (*No Impact*)

The proposed project is not located within a designated mineral resource recovery site. As described in Section 3.12.1, *Environmental Setting*, a portion of recent alluvium deposited by the Kern River has been classified MRZ-2, but the resource is located upstream the Kern River and outside the boundaries of the project area. Kern River deposits south of the project area include sediments which are predominately fine-grained, and gravel does not occur in economic concentrations in the subsurface. Additionally, there are no sand and gravel extraction sites within the project area. Therefore, the proposed project would not result in the loss of availability of locally important mineral resources, nor would the proposed project result in the loss of availability of locally important sand and gravel resources. No impact would occur.

Mitigation Measures

None Required

Significance Determination

No Impact

Cumulative Impacts

Impact 3.12-5: Concurrent construction and operation of the proposed project and related projects in the geographic scope would not result in cumulative short-term and long-term impacts to mineral resources. (*No Impact*)

The geographic scope of the potential cumulative impact to mineral resources encompasses the Kern Fan area of Kern County and portions of Metropolitan Bakersfield, California. The proposed project is located on land that is primarily used for agricultural purposes. No MRZs or important sand and gravel resources have been identified within the project area. Thus, there is no potential for the project to impact the availability of important mineral resources during construction and operation. Therefore, the proposed project would not contribute to cumulatively considerable impacts to mineral resources in the project region.

As described above in Section 3.12.1, *Environmental Settings*, six active oil/gas wellfields are located within the project area: Strand Oil Field, Greeley Oil Field, Bellevue West Oil field, Bellevue Oil Field, McClung (ABD) Oil Field, and Canal Oil Field. In the event that construction of the proposed project would occur within an active wellfield, the Authority would be required to accommodate existing and future drill islands in the project area to ensure that access to underlying mineral rights may continue during construction and operation of the proposed project. Therefore, the proposed project would not contribute to cumulatively considerable impacts to the availability of locally important oil/gas resources in the project region.

Mitigation Measures

None Required

Significance Determination

No Impact

3.12.4 References

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3.13 Noise and Vibration

This section evaluates the potential for noise and groundborne vibration impacts that may result from construction and operation of the proposed project. This section includes: an overview of the fundamental principles of noise and vibration and describes the existing noise environment in the project vicinity; a summary of applicable regulations related to noise and vibration; and an evaluation of the potential impacts of the proposed project related to noise and vibration on and around the project site, including cumulative impacts.

3.13.1 Environmental Setting

Noise Principles and Descriptors

An understanding of the physical characteristics of noise is useful for evaluating environmental noise impacts. The methods and metrics used to quantify noise exposure, human response, and relative judgment of loudness are also discussed, and noise levels of common noise environments are presented.

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and interferes with or disrupts normal activities. The effects of noise on people can be grouped into four general categories:

- Subjective effects (dissatisfaction, annoyance);
- Interference effects (communication and sleep interference, learning);
- Physiological effects (startle response); and
- Physical effects (hearing loss).

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. The subjective responses of individuals to similar noise events are diverse and influenced by many factors, including the type of noise, the perceived importance of the noise, its appropriateness to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity.

Interference effects of environmental noise refer to those effects that interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can include both awakening from sleep and arousal to a lesser state of sleep.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and amplitude. Frequency describes the sound's pitch (tone) and is measured in cycles per second (Hertz [Hz]), while amplitude describes the sound's pressure (loudness). Because the range of sound pressures that occurs in the environment is extremely

large, it is more convenient to express these pressures on a logarithmic scale that compresses the wide range of pressures into a more useful range of numbers. The standard unit of sound measurement is the decibel (dB). Hz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a given number of times per second. If the drum vibrates 100 times per second, it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the healthy human ear.

Sound levels are expressed by reference to a specified national/international standard. The sound pressure level is used to describe sound pressure (loudness) and is specified at a given distance or specific receptor location. In expressing sound pressure level on a logarithmic scale, sound pressure (dB) is referenced to a value of 20 micropascals (μPa). Sound pressure level depends not only on the power of the source but also on the distance from the source to the receiver and the acoustical characteristics of the sound propagation path (absorption, reflection, etc.).

Outdoor sound levels decrease logarithmically as the distance from the source increases. This decrease is due to wave divergence, atmospheric absorption, and ground attenuation. Sound radiating from a source in a homogeneous and undisturbed manner travels in spherical waves. As the sound waves travel away from the source, the sound energy is dispersed over a greater area, decreasing the sound pressure of the wave. Spherical spreading of the sound wave from a point source reduces the noise level at a rate of 6 dB per doubling of distance in a soft medium such as air.

Atmospheric absorption also influences the sound levels received by an observer. The greater the distance traveled, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances greater than 1,000 feet. The degree of absorption varies depending on the frequency of the sound as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest (i.e., sound carries farther) at high humidity and high temperatures, and lower frequencies are less readily absorbed (i.e., sound carries farther) than higher frequencies. Over long distances, lower frequencies become dominant as the higher frequencies are more rapidly attenuated. Turbulence, gradients of wind, and other atmospheric phenomena also play a significant role in determining the degree of attenuation. For example, certain conditions, such as temperature inversions, can channel or focus the sound waves, resulting in higher noise levels than would result from simple spherical spreading.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds in the environment do not consist of a single frequency. Instead, they are a broad band of many frequencies differing in sound level. Because of the broad range of audible frequencies, methods have been developed to quantify these values into a single number representative of human hearing. The most common method used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that is reflective of human hearing characteristics. Human hearing is less sensitive at low frequencies and extremely high frequencies

than at the mid-range frequencies. This process is termed "A weighting," and the resulting dB level is termed the "A-weighted" decibel (dBA).

Because A-weighting is designed to emulate the frequency response characteristics of the human ear and reflect the way people perceive sounds, it is widely used in local noise ordinances and State and federal guidelines, including those of the State of California and Kern County. Unless specifically noted, the use of A-weighting is always assumed with respect to environmental sound and community noise, even if the notation does not include the "A."

In terms of human perception, a sound level of 0 dBA is the threshold of human hearing and is barely audible by a healthy ear under extremely quiet listening conditions. This threshold is the reference level against which the amplitude of other sounds is compared. Normal speech has a sound level of 60 dBA at a distance of 3 feet. Sound levels above about 120 dBA begin to be felt inside the human ear as discomfort, progressing to pain at still higher levels. Humans are much better at discerning relative sound levels than absolute sound levels. The minimum change in the sound level of individual events that an average human ear can detect in an outdoor environment is about 1 to 3 dBA. A 3 to 5 dBA change is readily perceived. An increase (or decrease) in sound level of about 10 dBA is usually perceived by the average person as a doubling (or halving) of the sound's loudness.

Because of the logarithmic nature of the decibel, sound levels cannot be added or subtracted directly. However, some simple rules are useful in dealing with sound levels. First, if a sound's acoustical energy is doubled, the sound level increases by 3 dBA, regardless of the initial sound level (e.g., 60 dBA + 60 dBA = 63 dBA; 80 dBA + 80 dBA = 83 dBA). However, an increase of 10 dBA is required to double the perceived loudness of a sound, and a doubling or halving of the acoustical energy (a 3 dBA difference) is at the lower limit of readily perceived change.

Although dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most ambient environmental noise includes a mixture of noise from nearby and distant sources that creates an ebb and flow of sound, including some identifiable sources plus a relatively steady background noise in which no particular source is identifiable. A single descriptor, termed the equivalent continuous sound level (L_{eq}), is used to describe sound that is constant or changing in level. L_{eq} is the energy-mean dBA during a measured time interval. It is the "equivalent" sound level produced by a given constant source equal to the acoustic energy contained in the fluctuating sound level measured during the interval. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum instantaneous (L_{max}) and minimum instantaneous (L_{min}) noise level indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{10}, L_{50}, and L_{90} may be used, which represent the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of the measured time interval, respectively. Sound levels associated with L_{10} typically describe transient or short-term events, L_{50} represents the

median sound level during the measurement interval, and L_{90} levels are typically used to describe background noise conditions.

The Day-Night Average Sound Level (L_{dn} or DNL) represents the average sound level for a 24-hour day and is calculated by adding a 10 dBA adjustment to sound levels during the night period (10:00 p.m. to 7:00 a.m., the sleeping hours). The L_{dn} is the descriptor of choice and used by nearly all federal, State, and local agencies throughout the United States to define acceptable land use compatibility with respect to noise. Within California, the Community Noise Equivalent Level (CNEL) is often used in lieu of the L_{dn} scale. CNEL is very similar to L_{dn}, except that an additional 5 dBA adjustment is applied to the evening hours (7:00 p.m. to 10:00 p.m., the relaxation hours). Because of the time-of-day penalties associated with the L_{dn} and CNEL descriptors, the dBA value of L_{dn} or CNEL for a continuously operating sound source during a 24-hour period will be numerically greater than the dBA value of the 24-hour L_{eq}. Thus, for a continuously operating noise source producing a constant noise level operating for periods of 24 hours or more, the L_{dn} will be 6 dBA higher than the 24-hour L_{eq} value.

Although exposure to high noise levels has been demonstrated to cause physical, and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can include both awakening and arousal to a lesser state of sleep.

Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur[1]:

- Except in carefully controlled laboratory experiments, a change of 1 dBA or less in ambient noise levels cannot be perceived.
- Outside of the laboratory, a 3 dBA change in ambient noise levels is considered to be a barely perceivable difference.
- A change in ambient noise levels of 5 dBA is considered to be a readily perceivable difference.
- A change in ambient noise levels of 10 dBA is subjectively heard as doubling of the perceived loudness.

[1] California Department of Transportation (Caltrans), Technical Noise Supplement (TeNS), Section 2.2.1, September, 2013.

These relationships occur in part because of the logarithmic nature of sound and the decibel scale. The human ear perceives sound in a non-linear fashion; therefore, the dBA scale was developed. Because the dBA scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. Under the dBA scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dBA higher than one of the sources under the same conditions. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Under the dBA scale, three sources of equal loudness together produce a sound level of approximately 5 dBA louder than one source, and ten sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source.[2]

Fundamentals of Vibration

Vibration can be interpreted as energy transmitted in waves through the ground or man-made structures, which generally dissipate with distance from the vibration source. Because energy is lost during the transfer of energy from one particle to another, vibration becomes less perceptible with increasing distance from the source.

As described in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment*, groundborne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard.[3] In contrast to airborne noise, groundborne vibration is not a common environmental problem, as it is unusual for vibration from sources such as (rubber-tired) buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, heavy trucks traveling on rough roads, and construction activities, such as blasting, pile-driving, and operation of heavy-duty earth-moving equipment.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal in inches per second (in/sec), and is most frequently used to describe vibration impacts to buildings.

Groundborne noise is a result of groundborne vibration and specifically refers to the rumbling noise emanating from the motion of building room surfaces due to the vibration of floors and walls; it is perceptible only inside buildings.[4] The relationship between groundborne vibration and groundborne noise depends on the frequency content of the vibration and the acoustical absorption characteristics of the receiving room. For typical buildings, groundborne vibration that causes low frequency noise (i.e., the vibration spectrum peak is less than 30 Hz) results in a groundborne noise level that is approximately 50 decibels lower than the velocity level. For groundborne vibration that causes mid-frequency noise (i.e., the vibration spectrum peak is 30 to 60 Hz), the groundborne noise level will be approximately 35 to 37 decibels lower than the

2 Caltrans, Technical Noise Supplement (TeNS), Section 2.2.1.1, September, 2013.
3 FTA, Transit Noise and Vibration Impact Assessment, Section 7.1.3, 2018.
4 FTA, Transit Noise and Vibration Impact Assessment Manual, Section 5.4, 2018.

velocity level.[5] Therefore, for typical buildings, the groundborne noise decibel level is lower than the groundborne vibration velocity level.

Existing Ambient Noise and Vibration Environment

Noise

The proposed project would be located in a rural, agricultural area. Noise sources in rural areas are typically natural, including insects, birds, wind, and weather. Accordingly, existing ambient noise levels in rural areas such as the project sites are low. Background noise levels in rural areas typically range between 35 and 45 dBA DNL. The primary sources of noise in the rural agricultural areas are roadway traffic and farm machinery on a seasonal basis. Background noise levels are approximately 40 dBA in rural residential areas and 45 dBA in agricultural cropland with equipment operating (FERC 2002, USEPA 1978).

Vibration

Similar to the environmental setting for noise, the vibration environment is dominated by traffic from nearby roadways. Heavy trucks can generate ground-borne vibrations that vary depending on vehicle type, weight, and pavement conditions. As heavy trucks typically operate on major streets, existing ground-borne vibration in the project vicinity is largely related to heavy truck traffic on the surrounding roadway network. Vibration levels from adjacent roadways are generally not perceptible in the project area.

Sensitive Receptors

Noise

Land uses deemed sensitive by the State of California include schools, hospitals, rest homes, and long-term care and mental care facilities, which are considered to be more sensitive to ambient noise levels than others. Many jurisdictions also consider residential uses particularly noise-sensitive because families and individuals expect to use time in the home for rest and relaxation, and noise can interfere with those activities. Some jurisdictions may also identify other noise-sensitive uses such as churches, libraries, and parks. Land uses that are generally not considered to be noise sensitive receptors include office, commercial, industrial, and retail developments.

Consequently, the noise standards for sensitive land uses are more stringent than for those at less sensitive uses. The Kern County Noise Element has identified the following land uses as sensitive receptors: residential areas, schools, convalescent and acute care hospitals, parks and recreational areas, and churches (Kern County Planning Department, 2010).

The proposed project site is located in a rural area characterized by agriculture uses and scattered single-family residences. The closest relatively densely-populated residential sensitive receptors are located within the proposed Phase 1 area south of Highway 58 between Nord Avenue and Heath Road. The exact location of the project is currently unknown, but it is conservatively estimated that any project construction would take place within 50 feet of a sensitive receptor. The project area is located within a quarter-mile of the Del Rio Elementary School and

[5] FTA, Transit Noise and Vibration Impact Assessment Manual, Table 6-3 and Table 6-14, pages 126 and 146, 2018.

Bakersfield Christian High School, located at 600 Hidalgo Drive and 12775 Stockdale Highway, respectively. There are no churches or hospitals within a half-mile radius of the project area.

Vibration

Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly and sick), and vibration sensitive equipment. Sensitive vibration receptors for the proposed project are the same as the noise sensitive receptor presented above.

3.13.2 Regulatory Setting

Federal, State, and local agencies regulate different aspects of environmental noise and vibration. Federal and State agencies generally set noise standards for mobile sources such as aircraft, trains, and motor vehicles, while regulation of stationary sources is left to local agencies. Local regulation of noise involves implementation of general plan policies and noise ordinance standards. Local general plans identify general principles intended to guide and influence development plans; local noise ordinances establish standards and procedures for addressing specific noise sources and activities. Kern County has developed general plan policies, goals, and guidelines regarding the ambient noise environment, which would be applicable to the proposed project, as discussed below.

Federal

Noise Control Act of 1972 (42 USC § 4910)

The Noise Control Act of 1972 (42 USC § 4910) establishes a national policy to promote an environment for all Americans to be free from noise that jeopardizes their health and welfare. The Act establishes a means for the coordination of federal research and activities in noise control, authorizes the establishment of federal noise emissions standards for products distributed in commerce, and provides the noise-emission and noise-reduction characteristics of such products to the public.

United States Environmental Protection Agency, Environmental Noise Levels

The United States Environmental Protection Agency (USEPA) provided guidance on environmental noise levels in *Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety* (USEPA, 1974), commonly referenced as the "Levels Document," that establishes an L_{dn} of 55 dBA, as the requisite level, with an adequate margin of safety, for areas of outdoor uses, including residences and recreation areas. The Levels Document does not constitute USEPA regulations or standards, but identifies safe levels of environmental noise exposure without consideration of costs for achieving these levels or other potentially relevant considerations. It is intended to "provide State and local departure for the purpose of decision-making." USEPA is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues and therefore should not be construed as standards or regulations.

Federal Energy Regulatory Commission, Noise Guidelines

Federal Energy Regulatory Commission (FERC) *Noise Guidelines on Noise Emissions from Compressor Stations, Substations, and Transmission Lines* (18 CFR 157.206[d]5), require that the noise attributable to any new compressor stations, compression added to an existing station, or any modification, upgrade, or update of an existing station must not exceed an L_{dn} of 55 dBA at any pre-existing noise-sensitive area (such as schools, hospitals, or residences). This policy was adopted based on the USEPA-identified level of significance of 55 L_{dn} dBA.

Department of Housing and Urban Development, Environmental Standards

The Department of Housing and Urban Development (HUD) regulations (24 CFR Part 51) set forth the following exterior noise standards for new home construction, assisted or supported by the HUD:

- 65 L_{dn} or less – Acceptable
- > 65 L_{dn} and < 75 L_{dn} – Normally unacceptable, appropriate sound attenuation measures must be provided
- > 75 L_{dn} – Unacceptable

HUD's regulations do not contain standards for interior noise levels. A goal of 45 dBA L_{dn} is set forth, and attenuation requirements are geared to achieve that goal.

Occupational Safety and Health Administration, Occupational Noise Exposure

Occupational Safety and Health Administration (OSHA), *Occupational Noise Exposure; Hearing Conservation Amendment* (Federal Register 48 [46], 9738–9785, 1983) stipulates that protection against the effects of noise exposure shall be provided for employees when sound levels exceed 90 dBA over an 8-hour exposure period. Protection shall consist of feasible administrative or engineering controls. If such controls fail to reduce sound levels to within acceptable levels, personal protective equipment shall be provided and used to reduce exposure of the employee. Additionally, a Hearing Conservation Program must be instituted by the employers whenever employee noise exposure equals or exceeds the action level of an 8-hour time-weighted average sound level of 85 dBA $L_{eq\ (8)}$. The Program requirements consist of periodic area and personal noise monitoring, performance and evaluation of audiograms, provision of hearing protection, annual employee training, and record keeping.

State

The state requires all municipalities to prepare and adopt a comprehensive long-range general plan, which must contain a noise element (California Government Code Section 65302(f) and Health and Safety Code Section 46050.1). The requirements of the noise element include describing the noise environment quantitatively using a cumulative noise metric such as CNEL or L_{dn}, establishing noise/land use compatibility criteria, and establishing programs for achieving and/or maintaining land use compatibility. Noise elements should address all major noise sources in the community, including mobile and stationary noise sources. In California, most cities and counties have also adopted noise ordinances, which serve as enforcement mechanisms for controlling noise.

The California Department of Health Services has studied the correlation of noise levels and their effects on various land uses and established guidelines for evaluating the compatibility of various land uses, for the noise elements of local general plans, as a function of community noise exposure. The guidelines are the basis for most noise element land use compatibility guidelines in California.

The land use compatibility for community noise environment chart identifies the normally acceptable range for several different land uses, as shown in **Figure 3.13-1,** *Land Use Compatibility for Community Noise Environment*. Persons in low-density residential settings are most sensitive to noise intrusion, with noise levels of 60 dBA CNEL and below are considered "acceptable." For land uses such as schools, libraries, churches, hospitals, and parks, acceptable noise levels go up to 70 dBA CNEL.

CEQA Guidelines (PRC Sections 21000 et seq.) requires the identification of "significant" environmental impacts and their feasible mitigation. Section XI of Appendix G to the *CEQA Guidelines* (CCR Title 14, Appendix G) lists some indicators of potentially significant impacts, which are included below under the heading Thresholds of Significance.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, Part 2, Vol. 1, California Code of Regulations), which set forth an interior standard of 45 dBA CNEL or L_{dn} in any habitable room, requiring an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard, where such units are proposed in areas subject to noise levels greater than 60 dBA CNEL or L_{dn}. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

The State also establishes noise limits for vehicles licensed to operate on public roads (California Vehicle Code Sections 27200 et seq.). For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dBA at 15 meters. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by State and local law enforcement officials.

Local

Kern County General Plan: Noise Element

County policies for noise are included in the Noise Element of the Kern County General Plan (Kern County Planning Department 2010). The purpose of the Noise Element is to: (1) establish reasonable standards for maximum desired noise levels in Kern County, and; (2) develop an implementation program which could effectively deal with the noise problem. The County noise goals, policies, and standards are based on standards suggested by the U.S. Environmental Protection Agency (EPA) and the California Department of Health.

Figure 3.13-1 Land Use Compatibility for Community Noise Environment

	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

SOURCE: State of California, Governor's Office of Planning and Research, 2003.

Goals

Goal 1: Ensure that residents of Kern County are protected from excessive noise and that moderate levels of noise are maintained.

Goal 2: Protect the economic base of Kern County by preventing the encroachment of incompatible land uses near known noise producing roadways, industries, railroads, airports, oil and gas extraction, and other sources.

Policies

Policy 1: Review discretionary industrial, commercial, or other noise-generating land use projects for compatibility with nearby noise-sensitive land uses,

Policy 3: Encourage vegetation and landscaping along roadways and adjacent to other noise sources in order to increase absorption of noise,

Policy 4: Utilize good land use planning principles to reduce conflicts related to noise emissions.

Policy 5: Prohibit new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design. Such mitigation shall be designed to reduce noise to the following levels:

(a) 65 dB-L_{dn} or less in outdoor activity areas.

(b) 45 dB-L_{dn} or less within living spaces or other noise sensitive interior spaces.

Policy 7: Employ the best available methods of noise control.

Kern County Noise Ordinance

Chapter 8.36 of the *Kern County Code* addresses noise issues. These include acceptable hours of construction and limitations on construction related noise impacts on adjacent sensitive receptors. Noise producing construction activities that are audible to a person with average hearing ability at a distance of 150 feet from the construction site, or within 1,000 feet of an occupied residential dwelling are prohibited between the hours of 9:00 p.m. to 6:00 a.m. on weekdays, and 9:00 p.m. to 8:00 a.m. on weekends. However, the following exceptions are permitted:

1. The resource management director or his designated representative may for good cause exempt some construction work for a limited time.
2. Emergency work is exempt from this section.

3.13.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to noise. The proposed project would have a significant impact if it would:

1. 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.
2. Generation of excessive groundborne vibration or groundborne noise levels.
3. 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.
4. Result in cumulatively considerable impacts to noise.

Methodology

On-Site Construction Noise

On-site construction noise impacts were evaluated by determining the noise levels generated by the different types of construction activity anticipated, calculating the construction-related noise level at nearby sensitive receptor locations, and comparing these construction-related noise levels to existing ambient noise levels (i.e., noise levels without construction noise) at those receptors. More, specifically, the following steps were undertaken to assess construction-period noise impacts:

1. Typical noise levels for each type of construction equipment were obtained from the FHWA's Construction Noise Handbook (FHWA 2006);
2. Distances between construction site locations (noise sources) and surrounding sensitive receptors were measured using project site plans and Google Earth;
3. The construction noise level was then calculated, in terms of hourly L_{eq}, for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance.

Off-Site Roadway Noise (Construction)

Roadway noise impacts have been evaluated using the Caltrans Technical Noise Supplement (TeNS) method based on the construction inputs provided by the Authority and consistent with the assumptions used in Section 3.3, *Air Quality*. The Caltrans TeNS method allows for the definition of roadway configurations, barrier information (if any), and receiver locations.

Groundborne Vibration (Construction and Operations)

Groundborne vibration impacts were evaluated by identifying potential vibration sources, measuring the distance between vibration sources and surrounding structure locations, and making a significance determination based on the significance thresholds described below.

Impact Analysis

Temporary or Permanent Increase of Ambient Noise Levels

Impact 3.13-1: The proposed project could generate 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 with Mitigation*)

Construction

On-Site Construction Noise

Construction of the proposed project is estimated to require approximately 59 months and would require the use of heavy-duty equipment during the various construction phases at the project sites. During each stage of development, there would be a different mix of equipment. As such, construction activity noise levels at or near the project area would fluctuate depending on the particular type, number, and duration of use of the various pieces of construction equipment. Construction is currently anticipated to begin in the summer of 2021 with the potential of overlap for a number of phases of construction.

Individual pieces of construction equipment anticipated during Project construction could produce maximum noise levels of 79 dBA to 85 dBA L_{max} at a reference distance of 50 feet from the noise source, as shown in **Table 3.13-1**. These maximum noise levels would occur when equipment is operating at full power. The estimated usage factor for the equipment is also shown in Table 3.13-1, which are based on FHWA's Construction Noise Handbook (FHWA 2006). Typical or average construction noise levels account for the estimated usage factors as shown.

TABLE 3.13-1
CONSTRUCTION EQUIPMENT NOISE LEVELS

Construction Equipment	Estimated Usage Factor %	Noise Level at 50 Feet (dBA, L_{max})
Bore/Drill Rig Truck	20%	79
Cement and Mortar Mixers	40%	79
Cranes	16%	81
Excavator	40%	81
Graders	40%	85
Rubber Tired Loader	40%	79
Tractor/Loader/Backhoe	25%	80

SOURCE: FHWA 2006

Construction activity would result in the loudest noise levels at ground-level sensitive land uses nearest to the project area that have a direct line-of-sight to construction activities. This is because the first tier of buildings immediately surrounding the project sites would act as a noise barrier to other sensitive receptors located beyond these buildings. The project construction spans a large area with residential uses dispersed across predominantly agricultural uses. Therefore,

construction-related noise levels are only presented for receptors closest to the project sites. The receptors closest to the project site are conservatively assumed to be 50 feet away.

Noise from construction activities would be generated by the operation of vehicles and equipment involved during various stages of construction: recharge facilities, recovery wells, and conveyance facilities. For a conservative analysis, the worst-case construction noise levels were calculated assuming that a recharge facility, conveyance facility, and four recovery wells are being constructed simultaneously and all construction is happening at a location that is 50 feet away from the nearest off-site sensitive receptor.

The noise levels generated by construction equipment would vary depending on factors such as the type and number of equipment, the specific model (horsepower rating), the construction activities being performed, and the maintenance condition of the equipment. Construction noise associated with the proposed project was analyzed using a mix of typical construction equipment, estimated durations, and construction phasing, based on construction equipment data provided by the Authority and assumptions derived from similar projects. **Table 3.13-2** shows the estimated construction noise levels that would occur at the nearest off-site sensitive uses during a peak day of construction activity at the project site. Details are provided in **Appendix F**.

TABLE 3.13-2
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Levels (dBA L_{eq} at 50 feet)
Recharge Facilities	**90**
Demolition/Site Clearing	84
Pipelines	78
Basins	88
Restoration	82
Recovery Wells	**87**
Well Drilling	79
Well Construction	77
Pipelines	78
Conveyance Facilities	**83**
Turnouts, Pipelines, Canal	79
Pump stations - Grading	78
Pump stations - Construction	78
Maximum Overlapping Noise Level	**92**

SOURCE: FHWA 2006; ESA 2020

The noise levels shown in Table 3.13-2 represents composite noise levels associated with project construction activities, which take into account both the number of pieces and spacing of heavy construction equipment that are typically used during each phase of construction. These estimated maximum noise levels would not be continuous, nor would they be typical of noise levels

throughout the construction period. These noise levels would diminish notably with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 92 dBA L_{eq} measured at 50 feet from the noise source to the receptor would reduce to 86 dBA L_{eq} at 100 feet from the source to the receptor, and reduce by another 6 dBA L_{eq} to 80 dBA L_{eq} at 200 feet from the source to the receptor.

The nearest sensitive receptor to the project site is assumed to be 50 feet from the closest edge of construction, assuming that a recharge facility, conveyance facility, and four wells are being constructed simultaneously. The combined maximum noise level would be 92 dBA L_{eq}, however as mentioned above, this is a conservative estimate given that the exact locations of proposed facilities are not yet known.

Kern County does not have regulations restricting construction noise levels. Therefore, construction activities at any of the construction areas that would be in proximity to sensitive receptors would be operating in compliance with noise ordinance requirements as set forth by the County.

In addition, construction activities associated with the proposed project would be short-term and phased and would be required to comply with the noise regulations as stated in the County Municipal Code. Construction activity for the proposed project would generally occur between 7:00 a.m. and 6:00 p.m., Monday through Friday, which would not violate the construction hours established in the County Municipal Code. The Kern County Code prohibits noise-producing construction activities that are audible to a person with average hearing ability within 150 feet of the construction site, or within 1,000 feet of an occupied residential dwelling, between the hours of 9:00 p.m. to 6:00 a.m. on weekdays, and 9:00 p.m. to 8:00 a.m. on weekends. The drilling of the recovery wells would require 24-hour non-stop operation of a bore/drill rig for continuous days. Well construction and drilling would occur further than 150 feet from sensitive receptors, however given that exact locations are unknown, the well construction could occur within 1,000 feet of an occupied residential dwelling. All daytime construction activities for the proposed project within the County's allowable hours would not violate these restrictions, but 24-hour well drilling may result in temporary noise level increases outside of normally acceptable construction hours and within 1,000 feet of an occupied residential dwelling. As such, construction-related noise would be potentially significant and mitigation would be required.

Offsite Construction Noise

Delivery and haul truck trips would occur throughout the construction period. Trucks traveling to and from the project area would likely arrive and depart via Interstate 5 (I-5) and the Stockdale Highway, however the exact haul route is unknown. As a conservative worst-case analysis, haul, worker, and vendor trips were assumed to travel along the same roadway to and from the project sites and noise levels were calculate assuming a distance of 50 feet from the closest sensitive receptor. Details are provided in Appendix F.

During peak construction activity, there would be 20 worker trips, 2 vendor trips, and 105 haul trips visiting the site per day. Construction traffic noise levels generated by truck trips would reach a maximum noise level of approximately 57.9 dBA, L_{eq}. Construction truck trips would be

required to comply with the County's allowable hours as described above and would be temporary in nature. Therefore, construction activities would comply with the County's noise ordinance requirements, and impacts would be less than significant.

Operational Noise

Operational activities would be passive and include movement of water through pipes and canals. Potential noise sources during operation may include the pump station and noise associated with vehicular trips for maintenance and monitoring activities. Pump stations would be required to meet the County's ordinance limiting operational noise levels of stationary equipment to less than 65 dBA in outdoor areas and 45 dBA in indoor areas. Maintenance would involve activities such as weed and pest control and earthwork operations. Recharge basin maintenance would require transportation of minimal heavy-duty equipment to the project site (e.g., backhoe and front loader) and a small maintenance crew. However, maintenance and monitoring activities would occur infrequently, and the increase of vehicle trips would be minimal and would not substantially increase traffic volumes or noise levels, on adjacent roadways and highways. Therefore, operational noise impacts would not cause a permanent increase in ambient noise levels, and impacts would be less than significant.

Construction activities at the project sites would result in a temporary increase in noise levels in the project vicinity. Noise levels would be in accordance with the County noise ordinance requirements for construction during daytime hours; however, the project could violate the County's noise ordinance during 24-hour continuous well drilling. Implementation of **Mitigation Measure NOI-1** would ensure that construction impacts are less than significant. Operational activities would not significantly increase noise levels and would not create noise impacts. Therefore, the proposed project would not expose sensitive receptors to noise levels in excess of established standards.

Mitigation Measures

NOI-1: The construction contractors shall consider recovery well locations prior to 24-hour drilling to ensure that no occupied residential dwelling is within 1,000 feet of any well location. In the event that recovery well drilling cannot be sited greater than 1,000 feet from any occupied residential dwelling, a Noise Control Plan shall be developed and implemented prior to construction that includes best management practices to minimize exposure to high levels of noise and ensure compliance with the Kern County Noise Ordinance. Best management practices may include, but not be limited to the following:

- Place all stationary construction equipment so that emitted noise is directed away from occupied residential dwellings.
- Locate equipment staging in areas that will create the greatest possible distance between construction-related noise sources and noise-sensitive residential dwellings.
- Ensure proper maintenance and working order of equipment and vehicles, and that all construction equipment is equipped with manufacturers approved mufflers and baffles.

- Install sound-control devices in all construction and impact equipment. Additional equipment muffling beyond standard mufflers may be implemented.

- Install portable acoustic panels between the construction zone and sensitive land uses.

Significance Determination

Less than Significant Impact with Mitigation

Groundborne Vibration

Impact 3.13-2: The proposed project would not generate or result in excessive groundborne vibration or groundborne noise levels. (*Less than Significant Impact*)

Construction

Construction activities for the proposed project have the potential to generate low levels of groundborne vibration as the operation of heavy equipment (i.e., backhoe, dozer, grader, loader, and haul trucks, etc.) generates vibrations that propagate through the ground and diminish in intensity with distance from the source. No high-impact activities, such as pile driving or blasting, would be used during project construction. In order to evaluate potential structural damage, the nearest off-site sensitive buildings to the project area were conservatively assumed to be at a distance of 50 feet from any construction activity generating groundborne vibration. Groundborne vibrations from construction activities very rarely reach the levels that can damage structures, but they may be perceived in buildings very close to a construction site.

The PPV vibration velocities for several types of construction equipment that can generate perceptible vibration levels are identified in **Table 3.13-3**. Based on the information presented in Table 3.13-3, vibration velocities could range from 0.0012 to 0.0361 in/sec PPV at 50 feet from the source of activity.

TABLE 3.13-3
VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

	Approximate PPV (in/sec)					
Equipment	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**	**200 Feet**	**300 Feet**
Large Bulldozer	0.0361	0.0285	0.0213	0.0147	0.0060	0.0035
Loaded Trucks	0.0309	0.0244	0.0182	0.0125	0.0060	0.0035
Jackhammer	0.0142	0.0112	0.0084	0.0058	0.0051	0.0030
Small Bulldozer	0.0012	0.0010	0.0007	0.0005	0.0023	0.0014

SOURCE: FTA 2018; ESA 2020

Proposed construction activities would occur throughout the project area and would not be concentrated at the point closest to the nearest structure. Based on the vibration levels presented in Table 3.13-3, at a distance of 50 feet from the project area, the maximum vibration level would

be up to approximately 0.0361 in/sec PPV for a large bulldozer, which would not exceed the significance threshold of 0.2 in/sec PPV. Therefore, the use of all construction equipment would not result in a groundborne vibration velocity level above 0.2 inches per second at the nearest off-site structure. Therefore, impacts would be less than significant.

With respect to human annoyance and as shown in **Table 3.13-4**, the nearest residential buildings located within 50 feet from the project site would be exposed to vibration levels below the 80 VdB threshold for human annoyance. Therefore, impacts would be less than significant.

TABLE 3.13-4
VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

	Approximate Velocity Decibels (VdB)					
Equipment	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**	**200 Feet**	**300 Feet**
Large Bulldozer	77.9	75.5	72.6	68.9	59.9	54.6
Loaded Trucks	76.5	74.2	71.3	67.5	58.5	53.2
Jackhammer	69.8	67.4	64.5	60.8	51.7	46.5
Small Bulldozer	48.5	46.1	43.2	39.4	30.4	25.1

SOURCE: FTA 2018; ESA 2020

Operation

Sources of groundborne vibration would be unchanged from the existing conditions. Additionally, operational vibration impacts of the improvements at the reservoir would be consistent with the existing vibration velocity levels and with the existing ambient vibration velocity levels. As such, operational vibration impacts of the syphon reservoir improvements would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Excessive Noise Levels Near Airports

Impact 3.13-3: The proposed project would not expose people residing or working in the project area to excessive noise levels 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. (*No Impact*)

The proposed project is not located within two miles of public airport or public use airport or located within an airport land use plan area. The nearest airport to the project site is the Elk Hills-Buttonwillow Airport, located approximately 4 miles west of the BV8 Aqueduct Turnout. The

nearest public commercial airport is Meadows Field Airport, approximately 4 miles northeast of the project area. Therefore, the proposed project would not expose people residing or working in the area to excessive noise levels.

Mitigation Measures

None Required

Significance Determination

No Impact

Cumulative Impacts

Impact 3.13-4: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to noise. (*Less than Significant Impact with Mitigation*)

CEQA Guidelines require a discussion of cumulative impacts of a project "when the project's incremental effect is cumulatively considerable" (2011 *CEQA Guidelines*, Section 15130). As defined by Section 15065 (a)(3) "cumulatively considerable" 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 (2011 *CEQA Guidelines*, Section 15065 (a)(3)). These cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (*CEQA Guidelines* Section 15355).

Cumulative projects that may be constructed within 1,000 feet of the project area are listed in Table 3-2 of this Draft EIR. Should cumulative projects undergo construction at the same time as the proposed project, the cumulative projects would be required to comply with the construction hours allowed by the County or comply with County restrictions imposed if a variance to the allowable construction hours for these projects is issued. As previously discussed, the proposed project construction and operation would comply with the County's noise standard. However, 24-hour well drilling may result in temporary noise level increases outside of normally acceptable construction hours and within 1,000 feet of an occupied residential dwelling. With the implementation of best management practices for noise control during 24-hour well drilling activities, as required by Mitigation Measure NOI-1, impacts would be less than significant with mitigation. Therefore, the proposed project, when combined with the identified cumulative projects, would not cause a cumulatively considerable noise impact. With regard to groundborne vibration, the construction vibration levels generated by the project would be substantially below the FTA thresholds for structure damage or human annoyance. Vibration level diminish rapidly from the source and the range of vibration concern is usually limited to 50 feet from the vibration source; thus, the proposed project, when combined with the identified cumulative projects, would not cause a cumulatively considerable vibration impact. As a result, cumulative impacts would be less than significant.

Mitigation Measures

Implement Mitigation Measure NOI-1.

Significance Determination

Less than Significant Impact with Mitigation

3.13.4 References

California Department of Transportation (Caltrans), 2013. Technical Noise Supplement. September.

Federal Energy Regulatory Commission (FERC), 2002. *California State Lands Commission, Kern River 2003 Expansion Project, Draft Environmental Impact Statement/Environmental Impact Report*.

Federal Highway Administration (FHWA), 2006. *Roadway Construction Noise Model User's Guide*. January.

Federal Transit Administration (FTA), 2018. *Transit Noise and Vibration Impact Assessment.* September.

Kern County Planning Department, 2010. *Kern County General Plan Noise Element*.

United States Environmental Protection Agency (EPA), 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*.

United States Environmental Protection Agency (EPA), 1978. *Protective Noise Levels. Condensed Version of USEPA Levels Document, USEPA 550/9-79-100*.

3.14 Transportation

This section evaluates the potential for impacts related to transportation generated by construction and operation of the proposed project. This section includes: a description of the existing transportation and circulation conditions regionally and in and around the project area; a summary of applicable regulations related to transportation; and an evaluation of the potential impacts of the proposed project related to transportation and traffic in and around the project area, including cumulative impacts.

3.14.1 Environmental Setting

The project area is located in rural Kern County in the southern San Joaquin Valley west of Bakersfield, California. Kern County is a major transportation corridor that includes trucking routes, passenger vehicles, and railways. The roadway system in Kern County has been operating at acceptable conditions with isolated incidence of crowding. Kern County's roadway facilities consist of approximately 6,300 miles of highway.

Regional Setting

Major Highways

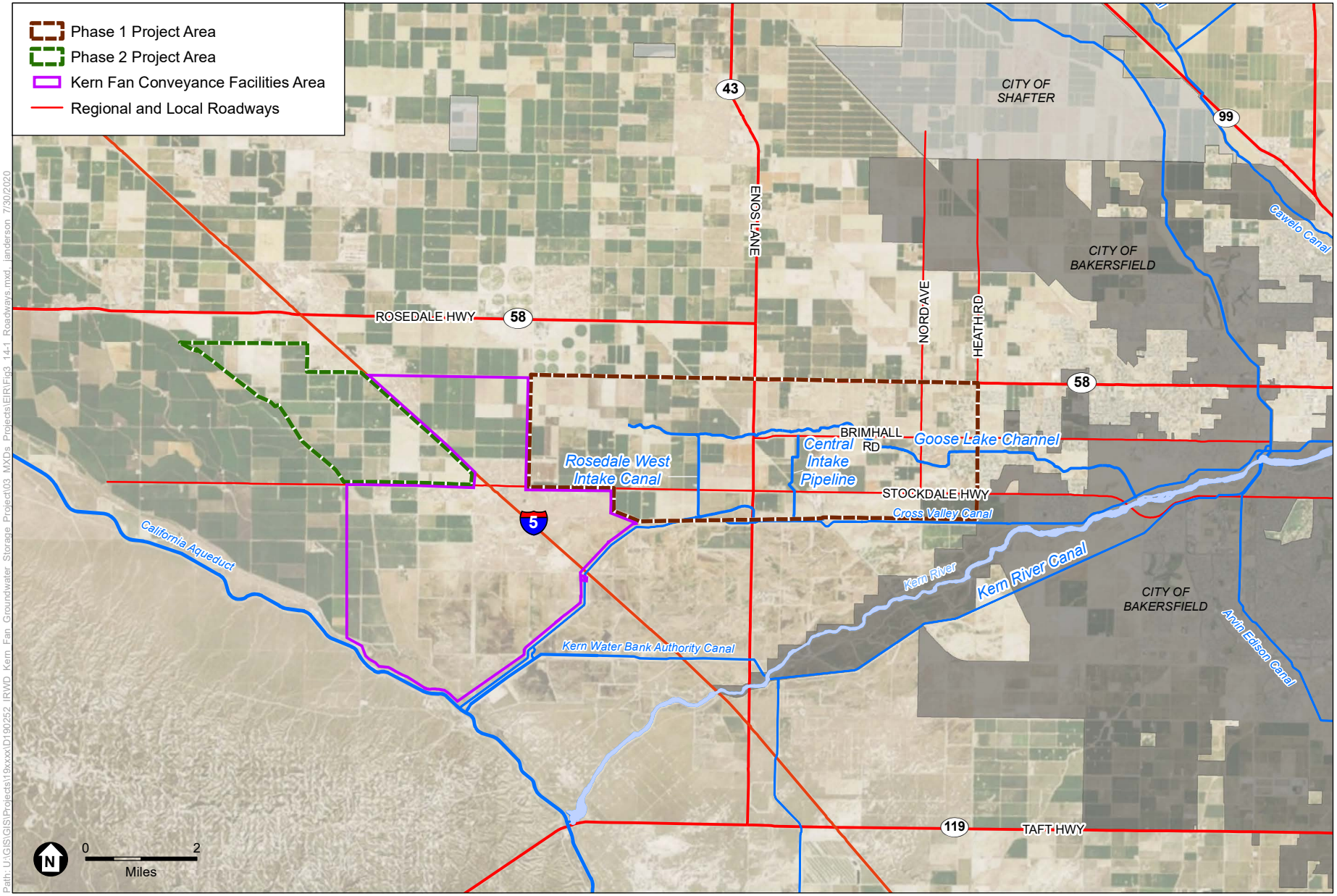
Together, Interstate 5 and the State highway system provide inter-regional connectivity to the project area from all directions (**Figure 3.14-1**). Interstate 5 (I-5) and State Route 43 (SR-43) provide north-south access to the project area, and State Route 58 (SR-58) and State Route 46 (SR-119) provide east-west access to the project area, which are described below. The project area also includes secondary arterial, collector, and local roads that serve regional and local transportation needs.

I-5 is a major north-south freeway that runs from the Mexican to Canadian border, connecting California, Oregon, and Washington. I-5 runs through the Kern Fan Conveyance Facilities area and along the northeast boundary of the Phase 2 project area.

SR-43/Enos Lane is a north-south trending highway that connects the towns of Shafter, Wasco, Hanford, and Selma. It runs parallel to SR-99. The route begins southwest of Bakersfield at the intersection of SR-119 and Enos Lane through rural farmland. SR-43 travels north/south through the Phase 1 project area.

SR-58/Rosedale Highway begins in San Luis Obispo County, travels east through Kern County through Bakersfield and Mojave, and ends in San Bernardino County. SR-58 runs adjacent to the northern boundary of the Phase 1 project area, and approximately 1 mile north of the Phase 2 project area.

SR-119 branches from SR-33 in Taft to SR-99 in Bakersfield. SR-199 runs in an east-west direction and intersects with I-5 and SR-43 approximately 6 miles south the project area.



SOURCE: Mapbox; Kern County

Kern Fan Groundwater Storage Project

Figure 3.14-1

Regional and Local Roadways

ESA

Traffic Volumes

The Kern Council of Government (Kern COG) collects information on average daily traffic counts on arterial roadways and freeways from Kern County, the 11 member cities of Kern COG, and the California Department of Transportation (Caltrans) in order to meet Kern County Congestion Management Program (CMP) requirements. This information is published online on the Kern County Traffic Count Map that shows Average Daily Traffic (ADT) in thousands of vehicles per day. ADT for the roadways and freeways in the immediate vicinity of the proposed project is shown in **Table 3.14-1**.

TABLE 3.14-1
EXISTING ROADWAY VOLUMES IN THE PROJECT AREA
AVERAGE ANNUAL DAILY TRAFFIC (ADT)

Roadway Segment	ADT
I-5 (SR-58 Junction)	42,500
I-5 (SR-43 Junction)	40,000
I-5 (Stockdale Road on/off ramp)	39,000
SR-43 (SR-58 West Junction)	8,600
SR-43 (SR-58 East Junction)	5,400
SR-43 (I-5 Junction)	6,600
SR-58 (SR-43 Junction)	5,500
SR-119 (I-5 Junction)	6,100
SR-119 (SR-43 N. Junction)	12,000
Stockdale Highway (west of I-5)	1,195
Stockdale Highway (east of I-5)	7,552
Brimhall Road (SR-43 intersection)	1,969
Nord Avenue (north of Stockdale Highway intersection)	1,946
Heath Road (south of SR-58)	3,308
Heath Road (north of SR-58)	2,941
Heath Road (north of Stockdale Highway intersection)	5,795

SOURCE: Caltrans 2018; Kern COG 2020

Truck Routes

Truck traffic contributes between 20 to 30 percent of traffic on Kern County roads (Kern County Planning Department 2009). Several highways in Kern County consist of 30 percent of truck trips with a total County average truck vehicle miles traveled (VMT) of about 24 percent, which is higher than the State average of 10 percent. Most trucks traveling through Kern County are interstate carriers; interstate trucking is controlled and regulated by the California Department of Transportation (Caltrans).

Non-Motorized Transportation

Kern County developed and adopted the first Bikeways Plan in the mid 1970's that called for bicycle lanes on various streets, exclusive bike paths on canals, along railroad right-of-ways, and along the

Kern River. The Kern County Bicycle Master Plan and Complete Streets Recommendations Report was adopted in October 2012, which encompasses the Kern County Bicycle Facility Plan (2001). There are over 67 miles of existing bicycle facilities in the unincorporated parts of Kern County. This consists of over 25 miles of Class II Bike Lanes, over 38 miles of Class III Bike Routes, and three miles of Class I Bake Path along the Kern River. The Kern County Bicycle Master Plan proposes 751 miles of new bikeways throughout the County (Kern COG 2012).

The bikeway network in Metropolitan Bakersfield has grown by more than 40 percent since adoption of the 2012 Kern County Bicycle Master Plan, mostly due to the installation of more than 40 miles of bicycle routes (Kern COG 2018). The Metropolitan Bakersfield area has approximately 260 miles of existing bikeways, including 44 miles of Class I Bikeways, 149 miles of Class II Bike Lanes, and 32 miles of Class III Bike Routes. Key regional connections in Metropolitan Bakersfield include the Kern River Parkway Path extending 32 miles along the Kern River from China Grade Loop to Enos Lane, and the bicycle lanes on Chester Avenue linking Oildale with Bakersfield. The Kern Region Active Transportation Plan (ATP) recommends an additional 695 miles of bikeway improvements in Metropolitan Bakersfield that are intended to provide connections where they do not currently exist, and improve the bicycling experience along some corridors with existing bikeways.

Bike Path (Class I): separate right of way with exclusive use of bicycles and pedestrians with crossflow minimized.

Bike Lane (Class II): striped lane for one-way bike travel on street or highway, and

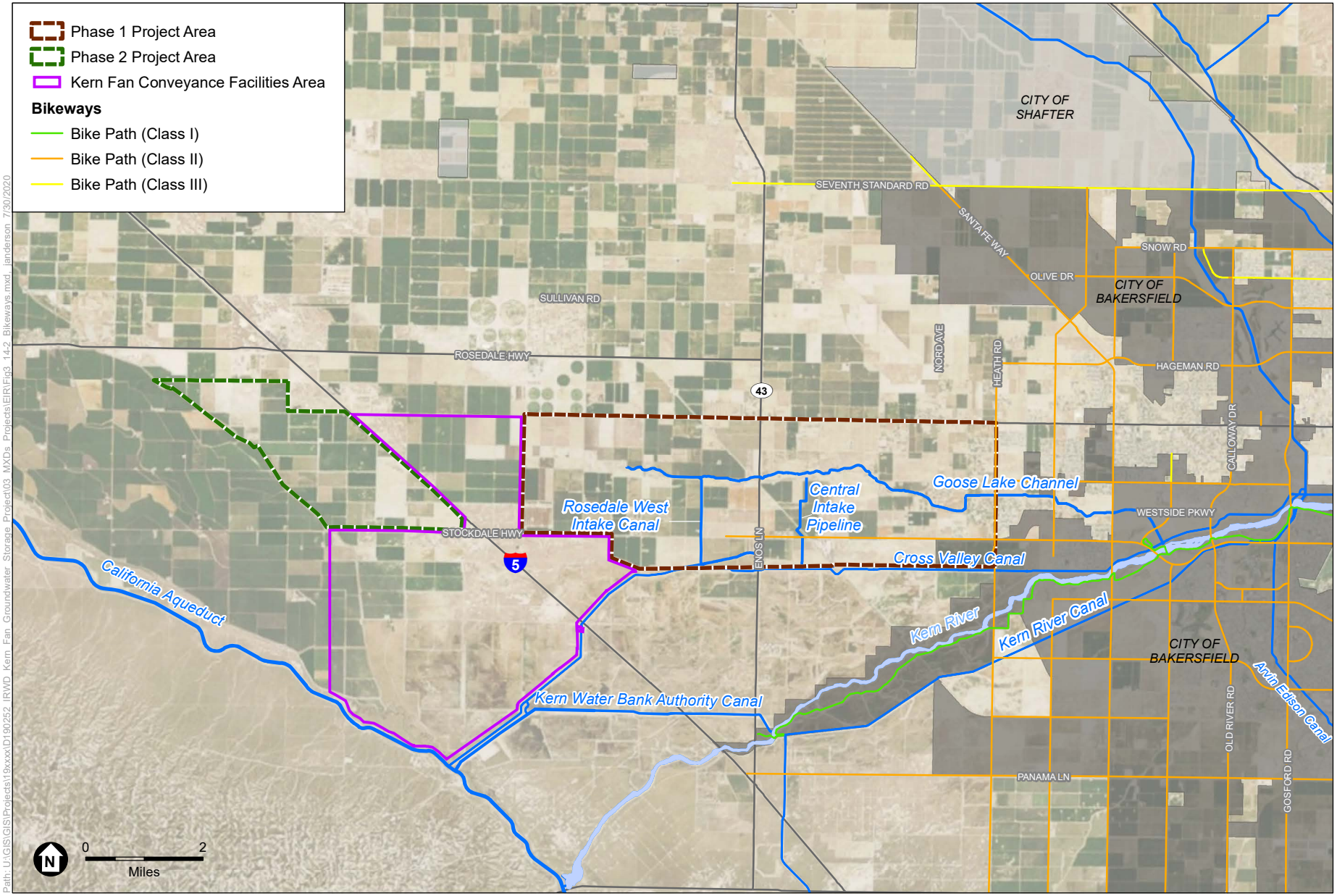
Bike Route (Class III): shared use with pedestrian or motor vehicle traffic.

The Kern River Parkway Bike Path is the nearest bikeway to the project area and reaches its southern terminus at Enos Lane approximately 3 miles south of the project area. In addition, the Kern Region ATP has proposed a series of bikeways on streets surrounding the project area, including Class II Bike Lanes on Rosedale Highway, Brimhall Road, Stockdale Highway, Enos Lane, and Heath Road, and a Class III Bike Route on Palm Avenue (see **Figure 3.14-2**).

Other Transportation Facilities

Public Transportation

Golden Empire Transit (GET) provides transit bus service to the Metropolitan Bakersfield area, including 90 buses and 16 routes (GET 2017; GET 2020). Kern Regional Transit (KRT) provides transit bus service between and within the rural communities of Kern County, including 16 fixed transit routes in most communities. The KRT system offers intercity service between Bakersfield, Wasco, Shafter, Buttonwillow, Kern River Valley, and other cities (Kern County Regional Transit Division 2020). The Taft-Bakersfield KRT Route (Route 120) runs through the Phase 1 area, traveling north/south via SR-43 and east/west via Stockdale Highway. Additionally, Lost Hills-Bakersfield KRT route (Route 115) runs through the City of Shafter via East Lerdo Highway and SR-43 approximately 8 miles north of the project area. KRT bus routes connect to GET but routes and to Amtrak passenger trains. The Amtrak station is located at Truxton Ave and S Street in Bakersfield. The Amtrak San Joaquin Route originates in Bakersfield and connects to northern cities such as Fresno and Sacramento. There are no Amtrak trains running south from Bakersfield (Amtrak 2020).



SOURCE: Mapbox; Kern County; City of Bakersfield

Kern Fan Groundwater Storage Project

Figure 3.14-2
Bikeways

ESA

Railways

Two railroad lines cross through central Kern County: the Atchison, Topeka & Santa Fe Railroad (ATSFRR) and the Southern Pacific Railroad (SPRR) (Kern County Planning Department 2009). Both lines run in a general north-south direction through Bakersfield. In the project vicinity, the Buttonwillow Branch of the SPRR runs west from Bakersfield and crosses the Kern River, Cross Valley Canal, Stockdale Highway, and SR-58.

3.14.2 Regulatory Setting

State

California Department of Transportation

The California Department of Transportation (Caltrans) has jurisdiction over State highways and sets maximum load limits for trucks and safety requirements for oversized vehicles that operate on highways. Western Kern County (i.e., including the project area and surrounding area) is under the jurisdiction of Caltrans District 6. The following Caltrans regulations apply to potential transportation and traffic impacts of the project:

- **California Vehicle Code, Division 15, Chapters 1 through 5 (Size, Weight, and Load).** Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways.
- **California Streets and Highway Code sections 660-711.** Requires permits from Caltrans for any roadway encroachment during truck transportation and delivery, includes regulations for the care and protection of State and county highways and provisions for the issuance of written permits, and requires permits for any load that exceeds Caltrans weight, length, or width standards for public roadways.
- **Project Development Procedures Manual, Chapter 27: Access Control Modification.** Requires Caltrans approval of proposed connections to a public road through submittal of a proposal to Caltrans (Caltrans 2016).

Senate Bill No. 743

Approved in 2013, Senate Bill (SB) 743 amended the *CEQA Guidelines* to provide an alternative to level of service (LOS) for evaluating transportation impacts. In accordance with Senate Bill (SB) 743, the new *CEQA Guidelines* Section 15064.3, subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the *CEQA Guidelines* criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas and shift the focus from automobile delay to reduction of greenhouse gas emissions, creation of multimodal networks, and promotion of a mix of land uses. Automobile delay, as measured by LOS and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. The intent of this legislation is to balance the need for traffic LOS standards with the need to build infill housing and mixed-use commercial developments within walking distance of mass transit facilities, downtowns, and town centers. In doing so, this legislation aims to provide greater flexibility to local governments to balance these sometimes competing needs. However, a jurisdiction may still adopt LOS as a performance standard for analyzing traffic conditions and maintaining throughput on its highway system. The

Governor's Office of Planning and Research (OPR) has proposed changes to the *CEQA Guidelines* that identify vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project's transportation impacts. Vehicle miles traveled, or VMT, is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person.

Local

Kern County General Plan

The proposed project is located within Kern County and is governed by the Kern County General Plan (Kern County Planning Department, 2009). The Circulation Element of the County General Plan includes goals and policies for transportation planning and development of facilities to support development in a manner that avoids traffic degradation, reduces environmental effects, and maintains quality of life (Kern County Planning Department, 2009). The policies, goals, and implementation measures in the Circulation Element for traffic and transportation that are applicable to the project are provided below.

2.3.4: Future Growth

> **Policy 2**: The County should monitor development applications as they relate to traffic estimates developed for this plan. Mitigation is required if development causes affected roadways to fall below Level of Service (LOS) D. However, development proposed as part of a Community Plan or Specific Plan that utilizes Smart Growth Policies that encourage efficient multi-modal movements (See Section 1.10.8) is allowed the flexibility to assess traffic and safety impacts through other means than Level of Service (LOS). Utilization of the CEQA process would help identify alternatives to or mitigation for such developments. Mitigation could involve amending the Land Use, Open Space, and Conservation Element to establish jobs/housing balance if projected trips in any traffic zone exceed trips identified for this Circulation Element. Mitigation could involve exactions to build offsite transportation facilities. These enhancements would reduce traffic congestion to an acceptable level.

2.3.10: Congestion Management Programs

State law requires that urbanized counties prepare an annual congestion management program (CMP). City and county eligibility for new gas tax subventions is contingent upon their participation in the congestion management program. To qualify for funding provided through the State Transportation Improvement Program (STIP) or the Federal Transportation Improvement Program (FTIP), the regional transportation agency must keep current a Regional Transportation Program (RTP) that contains the CMP. Also, the CMP offers local jurisdictions the opportunity to find cooperative solutions to the multi-jurisdictional problems of air pollution and traffic congestion.

The CMP has links with air quality requirements. The California Clean Air Act requires that cities and counties implement transportation control measures (TCMs) to attain, and maintain, the State air quality standard.

> **Goal 1**: To satisfy the trip reduction and travel demand requirements of the Kern Council of Government's Congestion Management Program.

Goal 2: To coordinate congestion management and air quality requirements and avoid multiple and conflicting requirements.

Policy 1: Pursuant to California Government Code § 65089(a), Kern County has designated Kern Council of Governments as the County's Congestion Management Agency (CMA).

Policy 2: The Congestion Management Agency is responsible for developing, adopting, and annually updating a Congestion Management Plan. The Plan is to be developed in consultation with, and with the cooperation of, the regional transportation agency (also Kern Council of Governments), regional transportation providers, local governments, Caltrans, and the air pollution control district.

Measure B: The elements within the Kern Congestion Management Program are to be implemented by each incorporated city and the County of Kern. Specifically, the land use analysis program, including the preparation and adoption of deficiency plans is required. Additionally, the adoption of trip reduction and travel demand strategies are required in the Congestion Management Program.

2.5.1: Trucks and Highways

Goal 2: Reduce potential overweight trucks.

Goal 3: Use State Highway System improvements to prevent truck traffic in neighborhoods.

Policy 1: California Department of Transportation (Caltrans) should be made aware of the heavy truck activity on Kern County's roads.

Policy 3: Promote a monitoring program of truck lane pavement condition.

Metropolitan Bakersfield General Plan

The project area is within the planning area of the Metropolitan Bakersfield General Plan (City of Bakersfield and Kern County 2007). The Circulation Element of the Bakersfield General Plan includes goals, policies, and implementation measures that are applicable to the proposed project:

Goal 2: Provide for safe and efficient motorized, non-motorized, and pedestrian traffic movement.

Goal 3: Minimize the impact of truck traffic on circulation, and on noise sensitive land uses.

Policy 6: Design and locate site access driveways to minimize traffic disruption where possible considering items such as topography, past parcelization, and other factors.

Policy 34: Minimize the impacts of land use development on the circulation system. Review all development plans, rezoning applications, and proposed general plan amendments with respect to their impact on the transportation system, and require revisions as necessary.

Policy 37: Require new development and expansion of existing development to pay for necessary access improvements, such as street extensions, widenings, turn lanes, signals, etc., as identified in the transportation impact report as may be required for a project.

Policy 39: Require new development and expansion of existing development to pay or participate in its pro rata share of the costs of expansions in area-wide transportation facilities and services which it necessitates

Kern Council of Governments Congestion Management Program

All urbanized areas with a population larger than 200,000 residents are required to have a Congestion Management System, program, or process. The Kern Council of Governments (Kern COG) refers to its congestion management activities as the Congestion Management Program (CMP). Kern COG was designated as the Congestion Management Agency.

The CMP provides a systematic process for managing congestion and information regarding (1) transportation system performance and (2) alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet State and local needs. The purpose of the CMP is to ensure that a balanced transportation system is developed that relates population growth, traffic growth and land use decisions to transportation system level of service (LOS) performance standards and air quality improvement. The program attempts link land use, air quality, transportation, advanced transportation technologies as integral and complementary parts of this region's plans and programs.

The purpose of defining the CMP network is to establish a system of roadways that will be monitored in relation to established LOS standards. At a minimum, all State highways and principal arterials must be designated as part of the Congestion Management System of Highways and Roadways.

Regional Transportation Plan

The latest Regional Transportation Plan (RTP) was prepared by the Kern COG, and was adopted on August 16, 2018. The 2018 RTP is a 24-year blueprint that establishes a set of regional transportation goals, policies, and actions intended to guide development of the planned multimodal transportation systems in Kern County. It was developed through a continuing, comprehensive, and cooperative planning process, and provides for effective coordination between local, regional, State, and federal agencies. Included in the 2018 RTP is the Sustainable Communities Strategy (SCS), which is required by California's Sustainable Communities and Climate Protection Act, of Senate Bill (SB) 375. The California Air Resources Board (CARB) set Kern greenhouse gas (GHG) emissions reductions from passenger vehicles and light-duty trucks by 5 percent per capita by 2020 and 10 percent per capita by 2035 as compared to 2005.

The intent of the SCS is to achieve the State's emissions reduction targets for automobiles and light trucks. The SCS will also provide opportunities for a stronger economy, healthier environment, and safer quality of life for community members in Kern County. The RTP/SCS seeks to: improve economic vitality; improve air quality; improve the health of communities; improve transportation and public safety; promote the conservation of natural resources and undeveloped land; increase access to community services; increase regional and local energy independence; and increase opportunities to help shape our community's future.

3.14.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to transportation. The proposed project would have a significant adverse effect on transportation if it would:

1. Conflict with a program, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities;
2. Conflict or be inconsistent with *CEQA Guidelines* Section 15064.3, subdivision (b);
3. Substantially increases hazards due to a geometric design feature (such as sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
4. Result in inadequate emergency access.
5. Result in cumulatively considerable impacts to transportation.

Methodology

The environmental analysis of the potential impacts related to transportation is based on a review of the following information sources: the definition of the proposed project provided above in Chapter 2, *Project Description*, the Kern County General Plan, transportation documents prepared by Kern County, Kern COG, and Caltrans, as well as other online sources describing existing transportation settings in the project area, all of which reflect the most up-to-date understanding of transportation systems in the project area and vicinity.

The proposed project would be regulated by the various laws, regulations, and policies summarized above in Section 3.16.2, *Regulatory Setting*. Compliance by the proposed project with applicable federal, State, and local laws and regulations is assumed in this analysis and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now.

Impact Analysis

Impact 3.14-1: The proposed project could conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. (*Less than Significant Impact with Mitigation*)

Construction

During project construction, additional vehicles would be added to local and regional roadways for purposes of construction worker commutes and delivery of construction equipment and materials. Construction of the proposed project would require up to 20 construction workers during each construction phase. Other construction-related vehicles would include water trucks, flat-back delivery trucks, and 10-wheel dump trucks. Other large construction equipment and vehicles would be delivered to the site via flat-bed trucks. Construction-related vehicles would be most likely to travel to and access the project areas via the major roadways in the project area, including Stockdale Highway, SR-43, SR-58, SR-119, and the I-5 Freeway. All staging areas for

vehicles and equipment, including parking, would be staged on-site within the boundaries of the Kern Fan Project Properties.

The AADT counts for all roads in the project vicinity are included in Table 3.14-1 above. AADTs at major roadways in the project area as follows: I-5/SR-58 Junction (42,500); I-5/SR-43 Junction (40,000); I-5/Stockdale Road on/off ramp (39,000); SR-43/SR-58 West Junction (8,600); SR-43/SR-58 East Junction (5,400); SR-43/I-5 Junction (6,600); SR-58/SR-43 Junction (5,500); SR-119/I-5 Junction (6,100); SR-119/SR-43 Junction (12,000); Stockdale Highway west of I-5 (1,195); Stockdale Highway east of I-5 (7,552). The daily increase of 20 construction worker commutes is not anticipated to affect the performance of the circulation system, as the increase in AADTs would be less than one percent on each major roadway. Other construction-related equipment would be transported into the project area and generate some additional trips; however, the equipment would remain staged onsite for the duration of construction and would not significantly affect local traffic or circulation. No import or export of soils via project area roadways would occur during construction, and no trips would be generated as a result of soil supplies import/export. During the site clearing and demolition phase at the beginning of the project, where the project would remove existing irrigation pipes on the project properties, demolition and construction debris would be removed from the project area and transported via project area roadways to landfill facilities on an as-needed basis. However, trips generated for landfill waste disposal would not be considered significant, as trips generated on any given day would be limited by the time it takes to remove pipelines, load waste haul trucks and drive to/from the landfill sites.

Construction of the Kern Fan Conveyance Facilities that would convey water to/from the California Aqueduct and the Kern Fan Properties would require tunneling under I-5 to avoid surficial impacts to the operation and circulation patterns of I-5. Construction of the Kern Fan Conveyance Facilities may require short-term lane or road closures on local surface roadways or detours within the project area as conveyance facilities are constructed. Implementation of **Mitigation Measure TRA-1** would require preparation and implementation of a Construction Traffic Control Plan that ensures the Authority provides signage and flagging to alert motorists of pending lane or road closures and detours. Because construction of the proposed project would not substantially increase traffic on nearby roadways, the proposed project would not conflict with any applicable plans, ordinances, or policies that establish measures of effectiveness for the performance of the circulation system around the project area. Therefore, the construction phase of the proposed project would have a less than significant impact with implementation of mitigation measures on traffic circulation.

Operation

Project operation would result in infrequent trips related to maintenance and monitoring activities at the project areas. Occasional maintenance and monitoring activities, such as weed and pest control operations and periodic earthwork operations, would not substantially increase traffic in the project area. During project operation, monitoring crews would visit the project area periodically to perform routine inspections of conveyance structures, recharge basins, wells, pumps, and other project facilities. Project monitoring would require minimal visits to the site and would not substantially affect surrounding roadways. Recharge basin maintenance would require

transportation of minimal heavy equipment to the project area (e.g., backhoe and front loader) and a small maintenance crew. The increase of vehicle trips would be minimal and would not substantially increase traffic volumes on adjacent roadways and highways.

The operations phase of the proposed project would require trip amounts that are not substantial relative to the existing AADTs of project-related roadways, and project implementation would not conflict with the goals set forth by the Kern County General Plan or any other applicable ordinance or policy that set forth to measure the effectiveness of the circulation system in the vicinity of the project area. Therefore, the operations phase of the proposed project would have a less than significant impact on traffic circulation.

Mitigation Measures

TRA-1: Traffic Control Plan. The construction contractor, in coordination with the Authority, shall prepare a Construction Traffic Control Plan that conforms to requirements of the Kern County Public Works Department and California Department of Transportation District 6, as applicable prior to the start of construction. The Construction Traffic Control Plan shall be prepared in accordance with both the California Department of Transportation Manual on Uniform Traffic Control Devices and Work Area Traffic Control Handbook and may include, but not be limited to, the following issues:

- Haul routes and timing of deliveries of heavy equipment, building materials and oversize loads;
- Directing construction traffic with a flag person;
- Placement of temporary signage, lighting, and traffic control devices if required;
- Access for emergency vehicles to the project sites;
- Temporarily closing travel lanes or delaying traffic during materials delivery;
- Detours or alternative routes for bicyclists using on-street bicycle lanes as well as for pedestrians using adjacent sidewalks

The Authority shall also notify local emergency responders of any planned partial or full lane closures required for project construction. Emergency responders include fire departments, police departments, and ambulances that have jurisdiction within the project area. Written notification and disclosure of lane closure location must be provided at least 30 days prior to the planned closure to allow emergency response providers adequate time to prepare for lane closures.

Significance Determination

Less than Significant Impact with Mitigation

Impact 3.14-2: The proposed project would not conflict or be inconsistent with *CEQA Guidelines* Section 15064.3, subdivision (b). (*Less than Significant Impact*)

CEQA Guidelines Section 15064.3, subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the *CEQA Guidelines* criteria for

determining the significance of transportation impacts are primarily focused on projects within transit priority areas, and shifts the focus from driver delay to reduction of greenhouse gas emissions, creation of multimodal networks, and promotion of a mix of land uses. Vehicle miles traveled, or VMT, is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person.

The newly adopted guidance provides that a lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section applied Statewide. Kern County is currently engaged in this process and has not yet formally adopted its updated transportation significance thresholds or its updated transportation impact analysis procedures. Since the regulations of SB 743 have not been finalized or adopted by the County, guidance from the State of California Office of Planning and Research's (OPR) December 2018 *Technical Advisory on Evaluating Transportation Impacts in CEQA* (Technical Guidelines), was relied upon in this Draft EIR to determine the significance of transportation impacts (OPR 2018).

As defined in *CEQA Guidelines* Section 15064.3(a), VMT refers to the amount and distance of automobile travel attributable to a project. The Technical Guidelines further explain that the automobile in Section 15064.3 "refers to on-road passenger vehicles, specifically cars and light trucks." For this reason, the focus of this VMT analysis is on passenger vehicle (i.e., cars and light trucks) trips generated by the project. It should be noted that this Draft EIR also includes an analysis of GHG emissions associated with heavy truck traffic generated by the project (as well as other traffic), and addresses potential significant transportation impacts of all project vehicles, including heavy trucks, related to air quality, noise, and safety (see Sections 3.3 *Air Quality*, 3.8 *Greenhouse Gas Emissions* and 3.13 *Noise*).

The Technical Guidelines provide a screening criterion that could be used to determine if VMT analysis is warranted for small projects, which are defined as projects that would generate fewer than 110 trips per day and may generally be assumed to cause a less than significant transportation impact. As indicated above in the discussion of Impact 3.14-1, construction of the proposed project would generate a maximum of 40 worker round-trips per day; worker trips generated during project operation and maintenance would be substantially lower than the trips generated by project construction. Therefore, daily passenger vehicle trips generated by the project would be well below OPR's recommended small-project screening criterion threshold of 110 trips per day, and the project's impact to VMT would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Design Hazards

Impact 3.14-3: The proposed project could substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). (*Less than Significant Impact with Mitigation*)

Project construction would require the delivery of heavy construction equipment that may require transportation by oversize vehicles on roadways. The use of oversize vehicles could create a hazard to the public by limiting views on the roadways, obstructing space, and reducing travel speed on the roadway. To ensure that construction-related oversize vehicle loads and travel are in compliance with applicable California Vehicle Code sections and California Street and Highway Codes applicable to licensing, size, weight, load, and roadway encroachment of construction vehicles, the construction contractor would prepare a Construction Traffic Control Plan that conforms to requirements of the Kern County Public Works Department and the California Department of Transportation District 6. The Construction Traffic Control Plan would identify construction delivery times and vehicle travel routes in advance to minimize construction traffic during peak a.m. and p.m. hours. The preparation and approval of the Construction Traffic Control Plan would further reduce construction-related traffic and roadway hazards in the project vicinity. Mitigation Measure TRA-1 would ensure the Construction Traffic Control Plan is developed prior to construction.

The Del Rio Elementary School, Bakersfield Christian High School, and Rio Bravo Greeley School are located near the project area. In the event that project facilities are be located within a quarter mile of the school, impacts related to the construction and operation of the proposed project could occur. Implementation of **Mitigation Measure HAZ-4** would require coordination with applicable school districts to determine a construction route that would not impact existing school safety routes. With implementation of mitigation measures, project impacts related to hazards and incompatible uses would be less than significant.

Mitigation Measures

Implement Mitigation Measure TRA-1 and Mitigation Measure HAZ-4.

Significance Determination

Less than Significant Impact with Mitigation

Emergency Access

Impact 3.14-4: The proposed project could result in inadequate emergency access. (*Less than Significant Impact with Mitigation*)

The Kern Fan Properties are located in a rural agricultural area with adequate egress and ingress to the sites via Stockdale Highway, Rosedale Highway (SR-58), Enos Lane (SR-43), Brimhall Road, Heath Road, and Nord Avenue in the event of an emergency. During construction of the Kern Fan Conveyance Facilities, the project would utilize jack and bore and tunneling techniques to avoid disruption of surface transportation features such as I-5. However, implementation of

some Kern Fan Conveyance Facilities may require temporary lane closures or a detour that could impact traffic within the project area. Construction-related traffic during installation of these facilities could affect emergency response to the project area and surrounding vicinity. To ensure emergency access is not impacted during construction in the project vicinity, the Authority would require the construction contractor to prepare a Construction Traffic Control Plan that would include assurance of access for emergency vehicles to the project area. Mitigation Measure TRA-1 would ensure the Construction Traffic Control Plan is prepared and implemented. Therefore, construction impacts would be less than significant.

Dirt roads would be constructed at the Kern Fan Project Properties along the perimeter of and in between all basins for access during operation and maintenance activities. Similar dirt roads already exist in some portions of the project area. These dirt roads would be constructed and accessible for emergency access within the project area, if necessary. Operation impacts would be less than significant.

Mitigation Measures

Implement Mitigation Measure TRA-1.

Significance Determination

Less than Significant Impact with Mitigation

Cumulative Impacts

Impact 3.14-5: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to transportation. (*Less than Significant Impact with Mitigation*)

The potential for cumulative transportation impacts exists where there are multiple projects proposed in an area that have overlapping construction schedule and/or project operations that could affect similar resources. Projects with overlapping construction schedules and/or operations could result in a substantial contribution to increased traffic levels throughout the surrounding roadway network. Cumulative impacts from the project, when considered with nearby, reasonably foreseeable planned projects, would occur only during project construction because project operation traffic would be minimal. As stated above in the evaluation of operational impacts, there would be minimal trip generation once construction activities have concluded. Therefore, operation of the project would result in less than significant cumulative impacts.

As described above, the proposed project would result in less than significant impacts on transportation with implementation of Mitigation Measure TRA-1. Even during construction, increased traffic associated with personnel and delivery of equipment and materials would not significantly affect road capacity or traffic volumes, given the rural location of the project and the low amount of existing traffic. Therefore, the proposed project, in conjunction with other cumulative projects in the area as identified in Table 3-2 of this Draft EIR would not contribute to

cumulative impacts on transportation. Cumulative impacts would be less than significant with implementation of Mitigation Measure TRA-1.

Mitigation Measures

Implement Mitigation Measure TRA-1.

Significance Determination

Less than Significant Impact with Mitigation

3.14.4 References

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Golden Empire Transit (GET), 2017. Golden Empire Transit District System Map. Available at: https://www.getbus.org/maps-and-timetables/, accessed July 21, 2020.

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Kern COG, 2018a. *Kern Region Active Transportation Plan*. Available at: https://www.kerncog.org/wp-content/uploads/2018/04/Kern_ATP_Plan.pdf, accessed July 22, 2020.

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Kern County Planning Department, 2009. *Kern County General Plan Circulation Element*.

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3.15 Tribal Cultural Resources

This section provides an assessment of potential impacts related to tribal cultural resources that could result from implementation of the proposed project. **Appendix G** of this Draft EIR contains documentation pertaining to outreach pertinent to potential tribal cultural resources.

3.15.1 Environmental Setting

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 (California Register) 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. A cultural landscape that meets these criteria is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape. Historical resources, unique archaeological resources, or non-unique archaeological resources, which are defined in Section 3.5, *Cultural Resources*, of this Draft EIR, may also be tribal cultural resources if they meet these criteria.

Ethnographic Setting

At the time of European contact, the Central Valley was occupied by speakers of the California Penutian language family, specifically the Yokuts. The Yokuts entered the San Joaquin Valley sometime prior to A.D. 1400, perhaps by force, as indicated by skeletal remains with fatal wounds inflicted by projectile points. Historically, Yokuts have been divided into three cultural-geographical groupings: Northern Valley, Southern Valley, and Foothills (Arkush 1993; Fagan 2003). The proposed project is located within the territory of the Southern Valley Yokuts.

The Southern Valley Yokuts territory included Tulare, Buena Vista, and Kern lakes and the lower portions of the Kings, Kaweah, Tule, and Kern rivers. Yokuts were organized into distinct groups each of which had their own name, dialect, and territory. Each group averaged about 350 persons (Wallace 1978a). Yokuts were uniquely egalitarian in their political organization. Local groups were self-governing and all members received equal ownership and access to most resources (Arkush 1993). The Southern Valley Yokuts established permanent settlements on high ground near larger bodies of water, above flood levels. Housing consisted of small round or oval-shaped structures framed by light wooden poles tied together and topped with tule mats.

Southern Valley Yokuts relied heavily on tule reeds for basketry and making floor mats. Basketry tools, such as awls, were manufactured primarily from large mammal bones. Cordage was constructed from milkweed. Stone was less abundant in the Southern Valley Yokuts territory than in the Northern Valley Yokuts territory and lithic material and milling implements were generally obtained through trade. Other items acquired through trade with neighboring groups include Olivella and abalone shells, as well as clam disk monetary beads (Wallace 1978a). The Southern Valley Yokuts used tule to construct watercraft.

Diets consisted mainly of fish, waterfowl, shellfish, roots, and seeds. Preferred fish included lake trout and, when available, steelhead, salmon and sturgeon. Chub, perch, and suckers were less desirable and caught in smaller numbers. Fish were caught by trolling with nets, diving with hand nets, spearing, or capturing fish via basketry traps, with bare hands, or with a bow and arrow. Available waterfowl included geese, ducks, and mud hens. Methods for capturing birds included snares, nets, bow and arrow, and throwing tule mats over their prey. Stuffed decoys were employed to assist in capture. The Yokuts also acquired eggs from nests (Wallace 1978b; Fagan 2003).

Other foodstuffs included freshwater mussels, turtles, wild seeds and roots, which were all consumed in large quantities. Grassnut roots were roasted whole or made into a paste. For the Southern Valley Yokuts, the absence of oak trees in the valley floor meant that acorns were only available by travel or trade. On occasion, wild pigeons, jackrabbits, ground squirrels, and burrowing rodents were acquired. Larger game, such as antelope and elk, were rarely hunted (Wallace 1978a, 1978b).

3.15.2 Regulatory Setting

Federal

Section 106 of the National Historic Preservation Act

National Historic Preservation Act (NHPA), as amended (54 United States Code of Laws [USC] 300101 et seq.), and its implementing regulations (36 Code of Federal Regulations [CFR] Part 800), is the primary law regarding federal government activities with regards to historic preservation activities. Section 106 of the NHPA requires consultation with Native American tribes. The goal of consultation is to identify potentially affected historic properties,[1] assess effects to such properties, and seek ways to avoid, minimize, or mitigate any adverse effects on such properties. Consultation with Indian tribes regarding issues related to Section 106 and other authorities (such as NEPA and Executive Order No. 13007) must recognize the government-to-government relationship between the federal government and Indian tribes, as set forth in Executive Order 13175, 65 FR 87249 (Nov. 9, 2000), and Presidential Memorandum of Nov. 5, 2009.

State

California Environmental Quality Act – Assembly Bill 52

Passage of Assembly Bill 52 (AB 52) in 2014 established procedures for government-to-government consultation between lead agencies and California Native American tribes, and established a new category of resources related to Native Americans that require consideration under CEQA, known as tribal cultural resources (*Public Resources Code* Section 21074(a)).

AB 52 requires that within 14 days of a lead agency determining that an application for a project is complete, or a decision by a public agency to undertake a project, a lead agency provide formal notification to the designated contact, or a tribal representative, of California Native American tribes that are traditionally and culturally affiliated with the geographic area of the project (as defined in *Public Resources Code* Section 21073) and who have requested in writing to be informed

[1] The term "historic property" refers to "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register" (36 CFR Part 800.16(l)(1)).

by the lead agency (*Public Resources Code* Section 21080.3.1(b)). Rosedale is a member of the Authority, and the proposed project would be located in and around the Rosedale service area. Rosedale has not received any written requests from California Native American tribes to be informed of projects under the jurisdiction of Rosedale. Accordingly, the Authority was not mandated by AB 52 to provide formal notification to any tribes related to the project. Despite the lack of requirement, the Authority directed tribal outreach efforts to solicit information about potential tribal cultural resources or concerns regarding the proposed project, the results of which are provided in Section 3.15.3.

California Government Code Sections 6254(r) and 6254.10

These sections of the California Public Records Act were enacted to protect archaeological sites from unauthorized excavation, looting, or vandalism. Section 6254(r) explicitly authorizes public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places and records of Native American places, features, and objects described in Sections 5097.9 and 5097.993 of the Public Resources Code maintained by, or in the possession of, the Native American Heritage Commission." Section 6254.10 specifically exempts from disclosure "records that relate to archaeological site information and reports, maintained by, or in the possession of the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, the Native American Heritage Commission, another State agency, or a local agency, including the records that the agency obtains through a consultation process between a Native American tribe and a State or local agency."

3.15.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the CEQA Guidelines are used as thresholds of significance to determine the impacts of the proposed project as related to tribal cultural resources. The proposed project would have a significant impact if it would:

1. 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:
    a. Listed or eligible for listing in the California Register of Historical Resources (California Register), or in a local register of historical resources as defined in *Public Resources Code* Section 5020.1(k), or
    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.

Methodology

Potential impacts to tribal cultural resources were assessed on the basis of a cultural resources assessment prepared for the project, which included a search of the Sacred Lands File (SLF) at the Native American Heritage Commission (NAHC) and the Native American outreach efforts referenced above and reflected in Appendix G.

The NAHC maintains a confidential SLF, which contains sites of traditional, cultural, or religious value to the Native American community. The NAHC was contacted on May 5, 2020 to request a search of the SLF. The NAHC responded to the request in a letter dated May 6, 2020 indicating that a search of the SLF was negative. The letter also included a list of California Native American tribes who may have knowledge of resources within the project area.

No California Native American tribes have requested notification of projects under the jurisdiction of Rosedale, as required by *Public Resources Code* Section 21080.3.1(b).[2] Thus, the Authority was not required to provide any formal notification pursuant to AB 52. Still, on July 23, 2020, outreach letters were sent via email or mail to the 16 Native American individuals representing 11 California Native American tribes listed on the NAHC's contact list provided on May 6, 2020. Recipients were requested to respond with information identifying sensitive sites in, or near, the proposed project area, or comments and concerns regarding the proposed project. Follow-up phone calls were placed on August 7, 2020. A summary of outreach efforts and responses is provided in **Table 3.15-1**.

Only one tribe, the Tejon Indian Tribe, responded that they have an interest in the project. The Tejon Indian Tribe requested the SSJVIC results, which were provided on September 3, 2020, and stated that they may wish to participate in future surveys.

[2] Section 3.11.2.1 summarizes the consultation requirements of *Public Resources Code* Section 21080.3 and related code sections.

TABLE 3.15-1
NATIVE AMERICAN OUTREACH

Contact Name	Title	Tribe	Response
James Rambeau	Chairperson	Big Pine Paiute Tribe of the Owens Valley	None received
Sally Manning	Environmental Director	Big Pine Paiute Tribe of the Owens Valley	No interest in project
Danelle Gutierrez	Tribal Historic Preservation Officer	Big Pine Paiute Tribe of the Owens Valley	None received
Juilo Quair	Chairperson	Chumash Council of Bakersfield	None received
Julie Turner	Secretary	Kern Valley Indian Community	None received
Robert Robinson	Chairperson	Kern Valley Indian Community	Project is outside Tribe's area of interest
Brandy Kendricks	-	Kern Valley Indian Community	None received
Delia Dominquez	Chairperson	Kitanemuk & Yowlumne Tejon Indians	None received
Jessica Mauck	Director of the Cultural Resources Management Department	San Manuel Band of Mission Indians	Project is outside of Serrano ancestral territory. Tribe does not wish to consult on the project.
Leo Sisco	Chairperson	Santa Rosa Rancheria Tachi Yokut Tribe	None received
Octavio Escobedo, III	Chairperson	Tejon Indian Tribe	None received
Colin Rambo	-	Tejon Indian Tribe	Tribe requested SSJVIC results, which were provided on 9/3/20. Tribe may wish to participate in future surveys.
Robert L. Gomez, Jr.	Chairperson	Tubatulabals of Kern Valley	None received
Neil Pevron	Chairperson	Tule River Indian Tribe	None received
Kenneth Woodrow	Chairperson	Wuksache Indian Tribe/Eshom Valley Band	None received
Mona Olivas Tucker	Chairwoman	yak tityu yak tilhini - Northern Chumash Tribe	Project is outside Tribe's homeland. Tribe deferred to Tejon Indian Tribe.

Impact Analysis

Tribal Cultural Resources Identified in the California Register

Impact 3.15-1a: The proposed project would not 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 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). (*No Impact*)

The NAHC's SLF does not contain records of sacred sites within the project area. Outreach to California Native American tribes did not result in identification of tribal cultural resources that are listed in or eligible for listing in the California Register, or in a local register of historical resources as defined in *Public Resources Code* Section 5020.1(k) within or in close proximity to the proposed project area. Given that no tribal cultural resources have been identified within or immediately adjacent to the proposed project area, construction and operation of the proposed project would not cause a substantial adverse change in the significance of a tribal cultural resource, and no mitigation would be required.

Mitigation Measures

None Required

Significance Determination

No Impact

Tribal Cultural Resource Determined to be Significant

Impact 3.15-1b: The proposed project would not cause a substantial adverse change in the significance of a tribal cultural resource, defined in *Public Resources 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 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 *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. (*No Impact*)

The NAHC's SLF does not contain records of sacred sites within the project area. Outreach to California Native American tribes did not result in identification of tribal cultural resources that are listed in or eligible for listing in the California Register, or in a local register of historical resources as defined in *Public Resources Code* Section 5020.1(k) within or in close proximity to the proposed project area. Given that no tribal cultural resources have been identified within or immediately adjacent to the proposed project area, construction and operation of the proposed project would not cause a substantial adverse change in the significance of a tribal cultural resource, and no mitigation would be required.

Mitigation Measures

None Required

Significance Determination

No Impact

Cumulative Impacts

Impact 3.15-2: Concurrent construction and operation of the proposed project and related projects in the geographic scope would not result in cumulative impacts to tribal cultural resources. (*No Impact*)

No tribal cultural resources were identified as part of the Authority's outreach to Native American groups. Given that no tribal cultural resources have been identified within the proposed project area, the proposed project would not cause a substantial adverse change in the significance of a tribal cultural resource, and no mitigation would be required. Therefore, the project would not contribute to any potential significant cumulative impact to tribal cultural resources.

Mitigation Measures

None Required

Significance Determination

No Impact

3.15.4 References

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3.16 Utilities and Service Systems

This section addresses the potential impacts related to utilities and service systems with implementation of the proposed project. This section includes: a description of existing applicable utility/service system providers as well as existing energy sources for the project area; a summary of applicable regulations related to the utilities/service systems sources available for the project site, and an evaluation of the potential for the proposed project to result in environmental impacts related to utilities/service systems. In addition, an evaluation of the potential cumulative impacts is provided.

3.16.1 Environmental Setting

Water

The Metropolitan Bakersfield planning area includes 408 square miles of land, including the existing City of Bakersfield limits and the City of Bakersfield Sphere of Influence (SOI) (refer to Figures 3.1-2). The City of Bakersfield SOI includes the eastern portion of the Phase 1 project area (City of Bakersfield and Kern County 2009). The majority of Metropolitan Bakersfield is served by the California Water Service Company (CWSC), a privately held public utility, which obtains its water supply principally from wells and is supplemented with surface water by the Kern County Water Agency (KCWA).

Water supply for the Metropolitan Bakersfield area is provided through both surface water and groundwater, each of which has several sources. The Southern San Joaquin Groundwater Basin and the primary groundwater aquifer below Metropolitan Bakersfield provide a substantial source of potable water to the Metropolitan Bakersfield area. Surface water supply for the Metropolitan Bakersfield areas comes from the Kern River, State Water Project (SWP), and the Federal Central Valley Water Project (CVP), all of which must be treated prior to distribution (City of Bakersfield and Kern County 2007). There are currently two surface water treatment plants in Metropolitan Bakersfield. One facility, the Henry C. Garnett Water Purification Plant, is owned and operated by the KWCA Improvement District 4. The plant treats water from the Kern River, SWP and CVP. The facility has reached a production flow of 60.3 mgd (KWCA 2017). Treated water is distributed to customers inside and outside the City of Bakersfield boundaries. The other facility is the 1.5-mgd water treatment plant owned and operated by CWSC. The plant was built and operated by the Olcese Water District, with CWSC assuming ownership in 1999. The facility treats only Kern River Water. Each plant uses a combination of chemical addition, settling, filtration, and disinfection to produce water of acceptable quality. The plants have produced an average of 24,000 acre-feet of water annually, which accounts for 12% of the City's total water supply.

Within the project area, the water supply for the agricultural lands outside of Metropolitan Bakersfield and the SOI is primarily groundwater, supplemented with surface water supplies through Rosedale and the KCWA. As described in detail in Chapter 2, *Project Description,* the proposed project would receive, recharge and store SWP Article 21 water, which is a surplus supply managed by DWR. Other water supplies also may be secured and acquired by the Authority from various sources, that may include federal, State, and local supplies through

transfers, balanced and unbalanced water exchange agreements, water purchases or temporary transfers, or other available means. Sources may also include supplies from the CVP, and high-flow Kern River water depending on annual hydrologic availability, water rights and regulatory considerations.

Wastewater / Sewer

The project area is served by five major wastewater treatment facilities: the City of Bakersfield's Treatment Plant No. 2, the City's Treatment Plant No. 3, the North of River Sanitary District (NORSD) plant, Kern Sanitation Authority (KSA) treatment plant, and the Lamont Public Utility District plant, which is located outside the planning area (City of Bakersfield and County of Kern, 2009). There are also several small, temporary treatment facilities in the Rosedale area north of the Kern River and west of NORSD's service area boundaries. Much of this area is developed using on-site septic tanks, as is a portion of the northeast (Rio Bravo) area of the City. Some of the developed Rio Bravo area is also sewered to small, community-level septic systems (City of Bakersfield and Kern County 2009). Locations for the proposed recharge facilities, recovery facilities, and conveyance facilities are yet to be determined but would be located within the project area shown in Figure 2-1. No existing or proposed facilities in the project area would be connected to a local sewer system.

Solid Waste

Solid waste collection services (residential and commercial) are provided by the City Sanitation Division within the City of Bakersfield and by contracted private haulers in the unincorporated area of Kern County. All solid waste generated within the Metropolitan Bakersfield is disposed of in county-operated landfills. Currently two County landfills are in operation to dispose of waste generated within Metropolitan Bakersfield: Bena and Shafter-Wasco. The landfills are located outside of City limits within Kern County.

Bena Landfill is located approximately 18 miles east of Bakersfield and is the primary landfill that serves Bakersfield. Currently the landfill has a maximum permitted capacity of 53,000,000 cubic yards and the current daily limits are 4,500 tons per day. As of July 2013, the remaining capacity was 32,808,260 cubic yards. The landfill will go inactive in 2046 (CalRecycle 2020a).

Shafter-Wasco Landfill is located one mile north of Lerdo Highway on Scofield Avenue in Kern County. Currently the landfill has a maximum permitted capacity of 21,895,179 cubic yards and the current daily limits are 1,500 tons per day. In 2013, the remaining capacity was 14,729,755 cubic yards. The landfill will go inactive in 2053 (CalRecycle 2020b).

Energy

The energy system in Kern County is supplied by three of California's largest utilities: Pacific Gas & Electric (PG&E), Southern California Edison, and Southern California Gas. PG&E currently serves electricity to the project area (California Energy Commission 2017). Electrical generation technologies present in Kern County include: cogeneration, wind energy, geothermal energy, biomass/transformation, solar energy, and hydroelectric. See Section 3.6, *Energy*, for further detail regarding existing electric utilities in the project area.

3.16.2 Regulatory Setting

State

California Energy Commission (CEC)

The CEC regulates the provision of natural gas and electricity within the State. The CEC is the state's primary energy policy and planning agency. Created in 1974, the CEC has five major responsibilities: forecasting future energy needs and keeping historical energy data, licensing thermal power plants 50 megawatts (MW) or larger, promoting energy efficiency through appliance and building standards, developing energy technologies and supporting renewable energy, and planning for and directing the State response to energy emergencies.

2005 California Energy Action Plan II and 2008 Update

The California Energy Action Plan II is the State's principal energy planning and policy document (California Energy Commission 2005 updated 2008). The plan identifies Statewide energy goals, describes a coordinated implementation plan for State energy policies, and identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. In accordance with this plan, the first priority actions to address California's increasing energy demands are energy efficiency and demand response (i.e., reduction of customer energy usage during peak periods in order to address system reliability and support the best use of energy infrastructure). Additional priorities include the use of renewable sources of power and distributed generation (i.e., the use of relatively small power plants near or at centers of high demand). To the extent that these actions are unable to satisfy the increasing energy and capacity needs, clean and efficient fossil-fired generation is supported.

California Public Utilities Commission

The California Public Utilities Commission (CPUC) regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies, in addition to authorizing video franchises. In 1911, the CPUC was established by Constitutional Amendment as the Railroad Commission. In 1912, the Legislature passed the Public Utilities Act, expanding the Commission's regulatory authority to include natural gas, electric, telephone, and water companies as well as railroads and marine transportation companies. In 1946, the Commission was renamed the California Public Utilities Commission. It is tasked with ensuring safe, reliable utility service is available to consumers, setting retail energy rates, and protecting against fraud.

California Department of Resources Recycling and Recovery

California Department of Resources Recycling and Recovery (CalRecycle) is the State agency designated to oversee, manage, and track California's 76 million tons of waste generated each year. It is one of six agencies under the umbrella of the California Environmental Protection Agency. CalRecycle administers and provides oversight for all of California's State-managed non-hazardous waste handling and recycling programs. CalRecycle provides training and ongoing support for local enforcement agencies that regulate and inspect California's active and closed solid waste landfills (CalRecycle 2020c).

California Urban Water Management Planning Act

Section 10610 of the *California Water Code* establishes the Urban Water Management Planning Act. The act states that every urban water service provider that serves 3,000 or more customers or that supplies over 3,000 acre-feet of water annually should prepare an Urban Water Management Plan (UWMP) every five years. The goal of a UWMP is to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years. IRWD certified its latest UWMP in June 2016 (IRWD 2016).

Regional Water Quality Control Board (RWQCB)

The primary responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and nine RWQCBs. The SWRCB sets Statewide policy for the implementation of State and federal laws and regulations. The RWQCBs adopt and implement Water Quality Control Plans (Basin Plans) which recognize regional differences in natural water quality, actual and potential beneficial uses, and water quality problems associated with human activities. The project sites are within the jurisdiction of the Central Valley Region.

California Department of Toxic Substances Control (DTSC)

The DTSC regulates hazardous waste, cleans up existing contamination, and looks for ways to reduce the hazardous waste produced in California. Over 1,000 scientists, engineers, and specialized support staff make sure that companies and individuals handle, transport, store, treat, dispose of, and clean up hazardous wastes appropriately.

California Department of Water Resources (DWR)

The California DWR is a department within the California Resources Agency. The DWR is responsible for protecting, conserving, developing, and managing much of California's water supply. These duties include: preventing and responding to floods, droughts, and catastrophic events; informing and educating the public on water issues; developing scientific solutions; restoring habitats; planning for future water needs, climate change impacts, and flood protection; constructing and maintaining facilities; generating power; ensuring public safety; and providing recreational opportunities.

California Water Code Section 13260

California Water Code Section 13260 requires any person who discharges waste, other than into a community sewer system, or proposes to discharge waste that could affect the quality of waters of the State to submit a report of waste discharge to the applicable Regional Water Quality Control Board (RWQCB). Any actions of the projects that would be applicable under *California Water Code* Section 13260 would be reported to the Central Valley RWQCB.

Integrated Solid Waste Management Act of 1989 (Public Resources Code 40050, et seq.) or Assembly Bill 939

Pursuant to the California Integrated Solid Waste Management Act of 1989, all cities in California are required to reduce the amount of solid waste disposed in landfills. Assembly Bill 939 required a reduction of 25 percent by 1995 and 50 percent by 2000. Contracts that include

work that will generate solid waste, including construction and demolition debris, have been targeted for participation in source-reduction, reuse, and recycling programs. The contractor is urged to manage solid waste generated by the work to divert waste from disposal in landfills (particularly Class III landfills) and maximize source reduction, reuse, and recycling of construction and demolition debris.

3.16.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to utilities and service systems. The proposed project would have a significant impact if it would:

1. 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.
2. Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.
3. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
4. 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.
5. Not comply with federal, State, and local management and reduction statutes and regulations related to solid waste.
6. Result in cumulatively considerable impacts to utilities and service systems

Methodology

The environmental analysis of the potential impacts related to utilities and service systems is based on a review of the following information sources: the definition of the proposed project provided in Chapter 2, *Project Description*, the *Metropolitan Bakersfield General Plan EIR*, and CalRecycle data, as well as the information provided above in Section 3.16.1, *Environmental Setting*, all of which reflect the most up-to-date understanding of utilities and service systems in the project area and vicinity.

The proposed project would be regulated by the various laws, regulations, and policies summarized in Section 3.16.2, *Regulatory Setting*. Compliance by the proposed project with applicable federal, State, and local laws and regulations is assumed in this analysis and local and State agencies would be expected to continue to enforce applicable requirements to the extent that they do so now.

Impact Analysis

Utilities Expansion and Relocation

Impact 3.16-1: The proposed project would not 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. (*Less than Significant Impact*)

The proposed project would implement water recharge and recovery facilities over two phases of construction on approximately 1,300 acres of agricultural or vacant land within or near the Rosedale service area. The proposed project would also implement the Kern Fan Conveyance Facilities that would consist of canals and/or pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the project facilities and the California Aqueduct. Since the proposed project in itself is a water facilities project, the environmental impacts that would occur as a result of the proposed project are discussed throughout Chapter 3 of this EIR. No other new or expanded water facilities would be required as a result of project implementation. Therefore, impacts related to water facilities would be less than significant with implementation of mitigation measures included throughout Chapter 3 of this Draft EIR.

The proposed project would not require the relocation or construction of new or expanded wastewater treatment or storm water drainage, natural gas, or telecommunication facilities. No impact would occur with regard to these areas. Impacts related to existing oil facilities in the project area are discussed in Section 3.12, *Mineral Resources*.

The majority of project operational activity would be passive, gravity driven movement of water through canals, pipes and basins. However, under conditions when gravity driven conveyance of water is not possible, operation of the proposed Kern Fan Conveyance Facilities would require electricity to power three pump stations along the alignment that would lift water from the California Aqueduct to the Phase 1 and Phase 2 recharge sites and other recharge facilities within Rosedale's Conjunctive Use Program. The three pump stations along the Kern Fan Conveyance Facilities would each require approximately 3,000,000 kilowatt hours per year (kwh/year), or 9,000,000 kilowatt kwh/year combined, to convey water to the recharge sites on an as-needed basis. Additionally, up to approximately 30,000,000 kwh/year would be required to operate the 12 recovery wells on the project site. Recharge and recovery operations are not expected to occur simultaneously, and during some periods neither recharge nor recovery would be occurring. Energy demand for operation the recharge and recovery facilities described above would be met by the existing PG&E electrical grid described for the project area in Section 3.16.1, *Environmental Setting*. In addition to the normal service application process, the Authority plans to provide PG&E with an overall project feasibility design at least 6 months prior to any service requests to allow for better discussion and system planning between the Authority and PG&E's engineering and planning division. The proposed project would not necessitate the construction or relocation of electric power facilities. Impacts are considered less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Water Supplies

Impact 3.16-2: The proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years. (*Less than Significant Impact*)

The proposed project does not require a new water supply. Water used for recharge as part of the proposed project would be conveyed between the California Aqueduct and the proposed Phase 1 and Phase 2 recharge facilities via the proposed Kern Fan Conveyance Facilities. As stated in Chapter 2, *Project Description*, source recharge waters for the proposed project would include SWP Article 21 water, which is a surplus supply managed by DWR, as well as Section 215 water, which is made available at Reclamation's discretion. However, other water supplies may be secured and acquired by the Authority for the proposed project depending on availability (See Section 2.4.2, *Recharge Water Supplies* for further detail). The other potential sources include but are not limited to the following: federal, State, and local supplies through transfers, balanced and unbalanced water exchange agreements, water purchases or temporary transfers, supplies from the CVP, and high-flow Kern River water depending on annual hydrologic availability, water rights and regulatory considerations. Agreements would be made, as necessary, in advance of any water exchanges or transfers.

The unregulated water captured under the project for recharge would consist of water that would otherwise have left Kern County or created flooding conditions. Therefore, relative to baseline conditions, the use of unregulated water for recharge would not result in significant impacts to other legal users of water. No impacts to water rights holders, other water suppliers, or other public utilities would occur from the purchase, exchange, or transfer of water from the sources identified above. Should water from other sources not suggested in Section 2.4.2 of this Draft EIR be acquired for recharge, additional analysis may be required subject to the discretion of the entity proposing to use such supplies for the proposed project purposes. Impacts would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Wastewater

Impact 3.16-3: The proposed project would not result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments. (*No Impact*)

The proposed project would not permanently increase wastewater generation in the project area and would not require a wastewater treatment provider to serve the project. Therefore, the proposed project would have no impact on the capacity of wastewater treatment providers listed in Section 3.16.1, *Environmental Setting*, to meet existing commitments in the project area.

Mitigation Measures

None Required

Significance Determination

No Impact

Solid Waste

Impact 3.16-4: The proposed project would not 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. (*Less than Significant Impact*)

Construction of the proposed project would involve activities that would have the potential to generate waste. To minimize the export of soil from the project site following construction activities, recharge basins and supply channels would be designed to balance earthwork onsite in which all excavated soils would be redistributed and utilized to construct the project facilities, requiring no imported materials and leaving no excess materials. Topsoil materials generated during construction would be stripped from the ground surface and used for construction of the earthen berms of the recharge ponds. Construction of recovery facilities would include using onsite materials to construct earthen well pads, drilling wells with a standard drill rig, constructing transformers onsite, and connecting aboveground wellheads, motor control centers, and pump houses to the transformers. These activities would not generate significant amounts of solid waste that would need to be removed from the project site. Installation of the recovery well conveyance system would require trenching to a depth about 7 feet, and Kern Fan Conveyance Facilities would require excavation of up to 22 feet and tunneling under Interstate-5. If any excess soils are generated, they will be redistributed on-site for construction of earthen berms for the recharge ponds.

Demolition and construction debris generated during implementation of the recharge facilities, recovery facilities, and/or conveyance facilities would be removed from the project site and transported to Bena Landfill and/or Shafter-Wasco Landfill, which have adequate capacity to accept construction waste that is generated during construction (See Section 3.16.1). Further, work would be conducted in compliance with all federal, State, and local statutes and regulations

related to solid waste and its disposal. Therefore, project construction impacts related to solid waste generation would be less than significant.

During operation, periodic earthwork operations would be required at the proposed recharge basins to maintain levees, enhance soil permeability, and remove undesirable vegetative growth unrelated to the proposed intermittent wetlands. Earthwork would involve disking or scraping the basins to remove the top layer (e.g., one inch) of sediment, approximately once every three years. Maintenance would redistribute soils on-site and would not require off-site soil removal or disposal. Agricultural land uses, such as annual farming, grazing, or fallowing, would be allowed within the proposed recharge basins when they are not needed for water recharge or water management purposes. Grazing could be used to remove or control vegetative growth. The transport, use, and disposal of fertilizers and pesticides associated with agricultural activities at the proposed recharge basins would be done in accordance with applicable regulatory requirements. Project impacts during operation and maintenance related to solid waste generation are considered less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Solid Waste

Impact 3.16-5: The proposed project would comply with federal, State, and local management and reduction statutes and regulations related to solid waste. (*No Impact*)

As discussed in Impact 3.16-4, above, construction, operation and maintenance of the proposed project would involve activities that would have the potential to generate solid waste. Statewide policies regarding solid waste have become progressively more stringent, reflecting Assembly Bill 939, which requires local government to develop waste reduction and recycling policies and meet mandated solid waste reduction targets. For the solid waste anticipated to be produced by the proposed project, the Authority would be required to comply with all laws and regulations related to the disposal and recycling of waste and for disposal of any hazardous materials resulting from demolition activities, as well as transport, use, and disposal of fertilizers and pesticides associated with agricultural activities at the proposed recharge basins (see Section 3.9, *Hazards and Hazardous Materials* for more information). All construction, operation, and maintenance work would be conducted in compliance with all federal, State, and local statutes and regulations related to solid waste and its disposal. There would be no impact.

Mitigation Measures

None Required

Significance Determination

No Impact

Cumulative Impacts

Impact 3.16-6: Concurrent construction and operation of the proposed project and related projects in the geographic scope would not result in cumulative short-term and long-term impacts to utilities and service systems. (*Less than Significant Impact*)

This section presents an analysis of the cumulative effects of the proposed project in combination with other present and reasonably foreseeable future projects that could generate cumulatively considerable impacts to utilities and service systems. As previously discussed, the proposed project would have no impact with regard to wastewater treatment or solid waste management and reduction statutes. Accordingly, the proposed project could not contribute to cumulative impacts related to these topics, and these topics are not discussed further.

The geographic area affected by the proposed project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative utilities and service systems impacts encompasses similar present and future project sites within Metropolitan Bakersfield and the Kern Fan Area, as well as the utilities and services systems that supply the project sites with water, solid waste disposal services, electricity, etc. Projects that may have cumulatively considerable impacts when considered in combination with the proposed project are listed in Table 3-2. However, only Cumulative Projects 3 through 10 shown in Figure 3-1 are considered in the cumulative impacts analysis for utilities and service systems. Cumulative Projects 1 and 2 are transportation infrastructure projects that would not require utilities services that are similar to the proposed project.

The timeframe during which the proposed project could contribute to cumulative utilities and service systems impacts includes both the construction and operations phases. For the proposed project, the operation phases are permanent. As stated previously, construction and operation of the proposed project would have less than significant impacts with regard to water supplies and solid waste generation as it relates to local infrastructure capacities and regulatory reduction goals. Thus, significant cumulative impacts related to utilities and services could occur if incremental impacts of the proposed project combined with one or more of the Cumulative Projects 3 through 10 substantially reduce water supply availability in the cumulative projects region, or generate solid waste in amounts that exceed local infrastructure capacities or otherwise impair the attainment of solid waste reduction goals.

The proposed project and Cumulative Projects 3 through 10, 12 and 13 are, by definition, groundwater supply projects that have or will be implemented for the purpose of ensuring water supply reliability in the region. The proposed project and Cumulative Projects 3 through 10, 12 and 13 have each identified multiple recharge source waters that would be available to serve the projects, while allowing for reasonably foreseeable future variability during normal, dry and multiple dry years. Thus cumulative impacts to water supplies would be less than significant. As described in the discussion for Impact 3.16-4, the proposed project would have a less-than-

significant impact to landfill capacities and solid waste reduction goals, since Bena Landfill and Shafter-Wasco Landfill have adequate capacity to accept construction waste that would be generated during temporary periods of construction and scheduled maintenance, and because the proposed work would be conducted in compliance with all federal, State, and local statutes and regulations related to solid waste and its disposal. Similarly, construction and operation of Cumulative Projects 3 through 10, 12 and 13 would generate solid waste over temporary time periods in accordance with planned construction schedules and maintenance activities. Landfills in the cumulative projects' region have adequate capacity to accept wastes generated by each of the Cumulative Projects into the foreseeable future. Further, the Cumulative Projects are required comply with all federal, State, and local statutes and regulations related to solid waste and its disposal. Compliance with regulatory measures as they relate to solid waste generation would ensure that cumulative impacts remain less than significant through each project's operation schedule. Thus, impacts related to solid wastes would not be cumulatively considerable and would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

3.16.4 References

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3.17 Wildfire

This section addresses the wildfire impacts associated with construction and operation of the proposed project. This section includes: a description of the wildfire history and conditions in the proposed project area; a summary of applicable regulations related to wildfire; and an evaluation of the potential impacts of the proposed project to wildfire, including cumulative impacts.

3.17.1 Environmental Setting

Project Area Characteristics

The proposed project is located immediately west of the City of Bakersfield, northwest of the Kern River and northeast of the California Aqueduct. The proposed project area is intersected by Interstate 5 and Highway 43. As described in Section 3.11, *Land Use and Planning*, land use in the vicinity of the project area is dominated by agriculture and open space, but also includes groundwater recharge activities, mineral and petroleum extraction, industrial land uses, and scattered rural residences as illustrated in Figure 3.11-1, which shows the location of the project and the land use designations for the area as provided by the Kern County General Plan.

Both the Phase 1 and Phase 2 project areas are largely designated as Intensive Agriculture and Rural Residential by the Kern County General Plan (Figure 3.11-1). The Intensive Agriculture designation allows for groundwater recharge facilities. The Phase 1 and Phase 2 areas are also largely zoned for Exclusive Agriculture and Limited Agriculture (Figure 3.11-2). The County Zoning Ordinance allows groundwater recharge facilities in Exclusive Agriculture.

Significant geographic features near the project area include the Greenhorn Mountains northeast of Bakersfield and the Los Padres National Forest to the south of the proposed project. The climate in the region is Mediterranean, with dry summers and moderately wet winters; however, the region has experienced severe drought conditions in recent years (USGS 2020). The proposed project area is also subject to Santa Ana Winds, which are dry strong downslope winds that affect Southern California. These typically occur later in the year after the dry summer. High winds and drier climate conditions can exacerbate fire risk as dry vegetation acts as a fire fuel as discussed below and the high winds can carry these flames creating larger wildfire risk.

Fire Environment

Fire environments are dynamic systems and include many types of environmental factors and site characteristics. Fires can occur in any environment where conditions are conducive to ignition and fire movement. The three major components of fire environments are vegetation (fuels), climate, and topography. The state of each of these components and their interactions with each other determines the potential characteristics and behavior of a fire at any given moment. It is important to note that wildland fire may transition to urban fire if structures are receptive to ignition. Understanding the existing wildland vegetation and fuel conditions in and around the project area is necessary to understand the fire environment.

The climate of Southern California, including the project area, has been characterized by fire climatologists as the worst fire climate in the United States with high winds (Santa Ana) occurring during autumn after a six-month drought period each year (J.E. Keeley 2004). As discussed above, Santa Ana winds can carry flames or sparks that can exacerbate wildfires. This is compounded by the higher coverage of dry vegetation as result of the dry summer climate in the area.

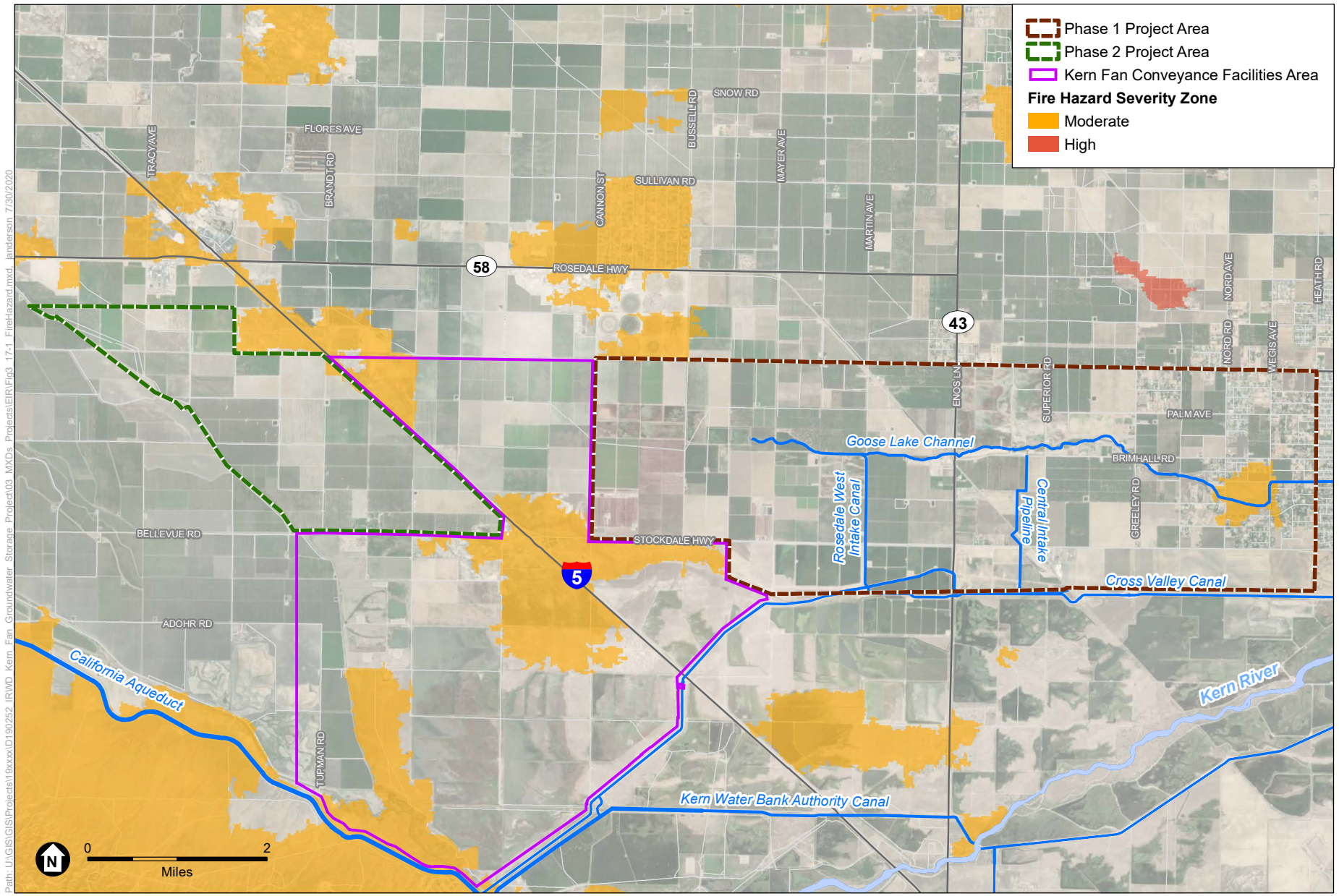
As defined by the *Public Resources Code (PRC)* Section 4126, State Responsibility Areas are State and privately owned forest, watershed, and rangeland for which the primary financial responsibility of preventing and suppressing wildland fires rests with the State. State Responsibility Areas, by definition, do not include any lands within city limits. The proposed project does not contain any State Responsibility Areas. Rather, the project is located within a Local Responsibility Area (LRA) (California Legislative Information 2020). LRAs are lands where the local government provides fire protection services instead of State or federal offices.

The California Department of Forestry and Fire Protection (CAL FIRE) maps fire hazard severity zones based on factors such fuel, slope, and fire weather to identify the degree of fire hazard throughout California (e.g., moderate, high, or very high). CAL FIRE also provides recommendations for fire hazard severity zones within Local Responsibility Areas but the responsibility for mapping Local Responsibility Areas lies within the local jurisdiction responsible for fire management and control. While fire hazard severity zones do not predict when or where a wildfire will occur, they do identify areas where wildfire hazards could be more severe and therefore are of greater concern (CAL FIRE 2020a)

Fire hazard severity zones in and around the project area are shown on **Figure 3.17-1**. According to the mapping completed by CAL FIRE, the proposed project is located in an area determined to have largely no fire hazard zones. As seen in Figure 3.17-1, there is a portion of the Phase 1 area and Kern Fan Conveyance Facilities area that is marked as a moderate fire hazard severity zone. The Phase 2 area is largely not designated with any fire hazard severity zone. There is a high fire hazard severity zone north of the Phase 1 area. However, the proposed project would not be constructed or operational in that area.

Vegetation (Fuels)

Vegetation and land cover types were identified onsite during biological resource surveys conducted for the proposed project. (see Section 3.3, *Biological Resources,* Figure 3.4-2, Vegetation Communities and Land Covers). The majority of the Phase 1 project area and entire Phase 2 project area consists of agricultural land. The agricultural land cover type supports orchards and row crops. Crops found within this land cover type include alfalfa, cotton, potato, grape, and pistachio divided by dirt access roads. Additionally, much of the Conveyance Facilities project area consists of this land cover type, located in the northern and western portions. This land cover type consists of approximately 15,375 acres.



SOURCE: ESRI; Kern County; FMMP, 2016

Kern Fan Groundwater Storage Project

Figure 3.17-1

Fire Hazard Severity Zones

ESA

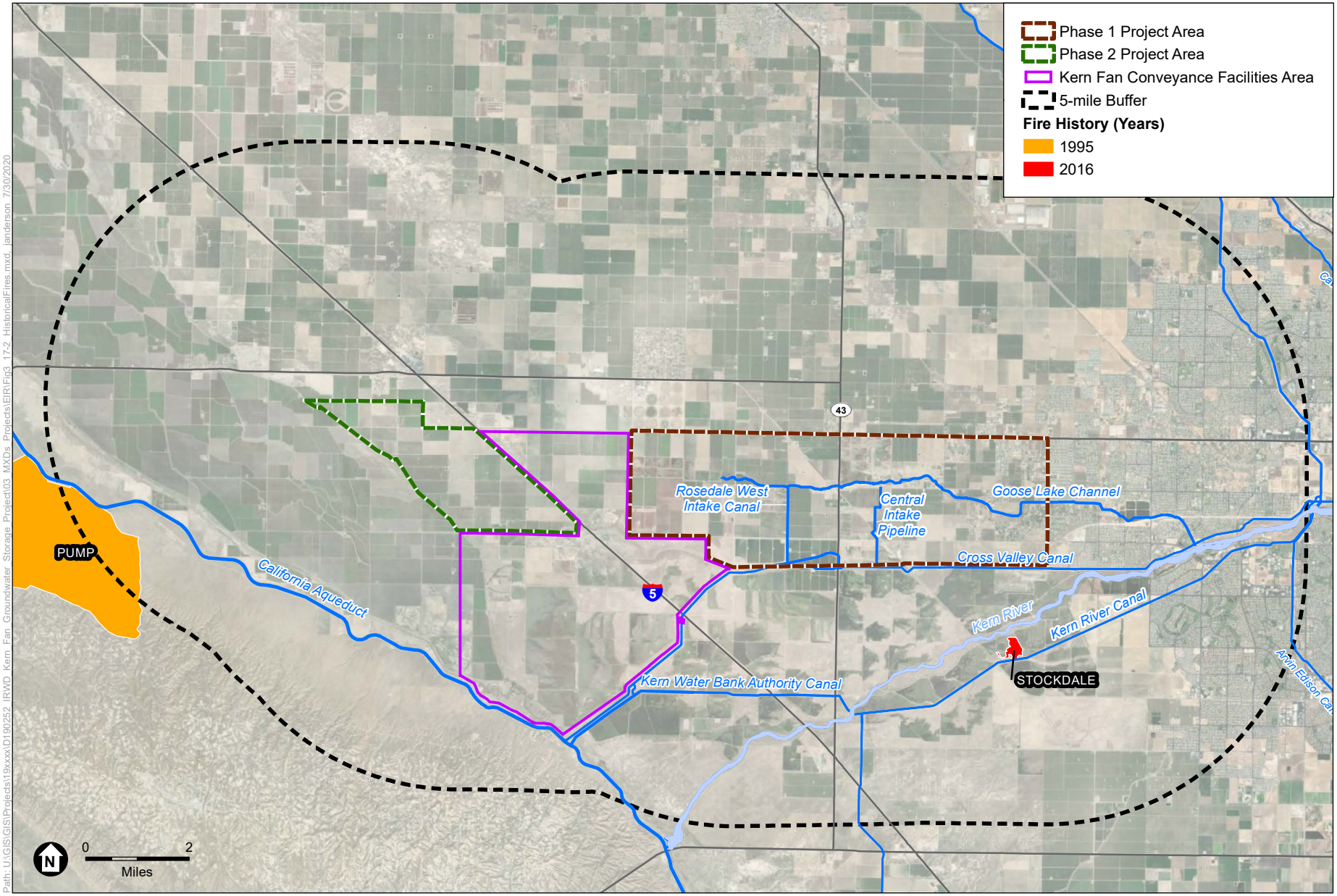
Several areas within the Phase 1 project area, mainly the eastern portion of the site, contain urban land cover types that consists of private residences, businesses, storage yards, and buildings. A small area within the central portion of the Conveyance Facilities project area consists of urban land cover. This land cover type consists of approximately 1,905 acres.

Numerous recharge basins reside within the Phase 1 and Conveyance Facilities project areas. These recharge basins have been converted from previously used agricultural fields. Raised access roads run between the basins with large culverts under each road to connect the basins. As previously discussed in Section 3.3, *Biological Resources*, the recharge basins consist of a mix of non-native and native vegetation species such as Russian thistle, shortpod mustard, annual burrweed, horseweed, and allscale saltbush. The recharge basins are also intentionally planted with safflower and rye. This land cover type consists approximately 5,015 acres.

Fire History

Fire history information can provide an understanding of fire frequency, fire type, most vulnerable locations, and significant ignition sources. The fire history data for the project area is based on CAL FIRE's California Statewide Fire Map that displays fires through 1950 and CAL FIRE's Fire Resource Assessment Program (FRAP) database that assesses the amount and extent of California's forests and rangelands, analyzes their conditions and identifies alternative management and policy guidelines. These tools show there is not a significant potential for wildfire near the project area, but the project region could be subject to the occasional wildfire encroachment, most likely originating from open space areas near the project area (CAL FIRE 2020b).

According to data available from CAL FIRE'S California Statewide Fire Map, there have been two fires within a three-mile radius of the project area since 1995, as seen in **Figure 3.17-2**. The most recent was the Stockdale Fire in 2016 located south of the Phase 1 area. This fire was a relatively small grass fire that burned 50 acres (KCFD 2020a). The second fire to occur within a three-mile radius of the project area was the Pump Fire that occurred in 1995. This fire was larger than the Stockdale Fire in 2016, and burned 8,804 acres.



SOURCE: ESRI; Kern County; CalFire, 2020

Kern Fan Groundwater Storage Project

Figure 3.17-2
Historical Fires

ESA

3.17.2 Regulatory Setting

Federal

No federal regulations related to wildfire are applicable to the proposed project.

State

Wildland fire protection in California is the responsibility of the local, State, or the federal government depending on the jurisdiction where the fire event is located. The local responsibility areas (LRAs) include incorporated cities, unincorporated County areas, cultivated agriculture lands, and portions of the desert. LRA fire protection is typically provided by county fire departments, city fire departments, fire protection districts, and by CAL FIRE under contract to local government. The State responsibility area (SRA) is a legal term defining the area where the State has financial responsibility for wildland fire protection. CAL FIRE is responsible for fire protection within State Responsibility Areas (SRA) in most of the counties in the State. However, in Kern, Los Angeles, Marin, Orange, Santa Barbara, and Ventura Counties, SRA fire protection services are provided by these respective counties under contract with CAL FIRE. Known as "Contract Counties," these Counties collectively protect 3.4 million acres of SRA. Contract Counties are responsible for providing the initial response to fires within SRAs. When a wildland fire escapes this initial attack, CAL FIRE responds with firefighting resources to assist the County. The Kern County Fire Department and CAL FIRE resources that provide fire protection for the project area are discussed below (CAL FIRE 2020c).

California Department of Forestry and Fire Protection

CAL FIRE is dedicated to fire protection and stewardship of over 31 million acres of California's privately owned wildlands. CAL FIRE's mission includes management and protection of California's natural resources, CAL FIRE's firefighters, fire engines, and aircraft respond to an average of more than 5,600 wildland fires each year and oversees enforcement of California's forest practice regulations, which guide timber harvesting on private lands (KCFD 2020b).

CAL FIRE provides Fire Hazard Severity Zone Maps for SRA lands as discussed above in Section 3.17.1, *Environmental Setting*. In addition, CAL FIRE requires counties within the State to develop fire protection management plans that address potential threats of wildland fires. The Kern County Wildland Fire Management Plan identifies federal, State, and local responsibility areas for the entire County to facilitate coordination efforts for fire protection services. Refer to the discussion of the Kern County Emergency Operations Plan provided below.

California Fire Code (California Code of Regulations Title 24, Part 9)

The California Fire Code is found in Title 24, Part 9 of the CCR, as a subsect of the California Building Code (CBC). The California Fire Code combines the Uniform Fire Code with amendments necessary to address California's unique needs. The California Fire Code (Title 24, Part 9 of the CCR) establishes regulations to safeguard against the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises. The California Fire Code also establishes requirements intended to provide safety for and assistance to firefighters and emergency responders during emergency operations. The provisions of the California 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 California. The California Fire Code includes regulations regarding fire-resistance-rated construction, fire protection systems such as alarm and sprinkler systems, fire service features such as fire apparatus access roads, means of egress, fire safety during construction and demolition, and wildland-urban interface areas (CBSC 2017).

Typical fire safety requirements of the California Fire Code include: the installation of sprinklers in all high-rise buildings; the establishment of fire resistance standards for fire doors, building materials, and particular types of construction; and, the clearance of debris and vegetation within a prescribed distance from occupied structures in wildfire hazard areas. The California Fire Code applies to all occupancies in California, except where more stringent standards have been adopted by local agencies.

Cal/Occupational Safety and Health Administration (OSHA) Regulations (CCR Title 8)

Cal/OSHA has primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations. Cal/OSHA standards are generally more stringent than federal regulations. Concerning the use of hazardous materials in the workplace require employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.

California Public Resources Code

The California PRC was established in 1939 by the California Code Commission. The PRC contains law relating to natural resources, the conservation, utilization, and supervision thereof, along with mines and mining, oil and gas, and forestry. The following sections of the PRC are relevant to the proposed project:

PRC Section 4427

During any time of the year when burning permits are required, no person shall use or operate any motor, engine, boiler, stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices from which a spark, fire, or flame may originate, which is located on or near any forest-covered land, brush-covered land, or grass-covered land, without doing both of the following:

(a) First clearing away all flammable material, including snags, from the area around such operation for a distance of 10 feet.

(b) Maintain one serviceable round point shovel with an overall length of not less than forty-six (46) inches and one backpack pump water-type fire extinguisher fully equipped and ready for use at the immediate area during the operation.

This section does not apply to portable power saws and other portable tools powered by a gasoline-fueled internal combustion engine.

PRC Section 4428

No person, except any member of an emergency crew or except the driver or owner of any service vehicle owned or operated by or for, or operated under contract with, a publicly or privately owned utility, which is used in the construction, operation, removal, or repair of the property or facilities of such utility when engaged in emergency operations, shall use or operate any vehicle, machine, tool or equipment powered by an internal combustion engine operated on hydrocarbon fuels, in any industrial operation located on or near any forest, brush, or grass-covered land between April 1 and December 1 of any year, or at any other time when ground litter and vegetation will sustain combustion permitting the spread of fire, without providing and maintaining, for firefighting purposes only, suitable and serviceable tools in the amounts, manner and location prescribed in this section.

(a) On any such operation a sealed box of tools shall be located, within the operating area, at a point accessible in the event of fire. This fire toolbox shall contain: one backpack pump-type fire extinguisher filled with water, two axes, two McLeod fire tools, and a sufficient number of shovels so that each employee at the operation can be equipped to fight fire.

(b) One or more serviceable chainsaws of three and one-half or more horsepower with a cutting bar 20 inches in length or longer shall be immediately available within the operating area, or, in the alternative, a full set of timber-felling tools shall be located in the fire toolbox, including one crosscut falling saw six feet in length, one double-bit ax with a 36-inch handle, one sledge hammer or maul with a head weight of six, or more, pounds and handle length of 32 inches, or more, and not less than two falling wedges.

(c) Each rail speeder and passenger vehicle, used on such operation shall be equipped with one shovel and one ax, and any other vehicle used on the operation shall be equipped with one shovel. Each tractor used in such operation shall be equipped with one shovel.

(d) As used in this section:

    (1) "Vehicle" means a device by which any person or property may be propelled, moved, or drawn over any land surface, excepting a device moved by human power or used exclusively upon stationary rails or tracks.

    (2) "Passenger vehicle" means a vehicle which is self-propelled and which is designed for carrying not more than 10 persons including the driver, and which is used or maintained for the transportation of persons, but does not include any motortruck or truck tractor.

PRC Section 4431

During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate or cause to be operated in the area any portable saw, auger, drill, tamper, or other portable tool powered by a gasoline-fueled internal combustion engine on or near any forest-covered land, brush-covered land, or grass-covered land, within 25 feet of any flammable material, without providing and maintaining at the immediate locations of use or operation of the saw or tool, for firefighting purposes one serviceable round point shovel, with an overall length of not less than 46 inches, or one serviceable fire extinguisher. The Director of Forestry and Fire Protection shall by administrative regulation specify the type and size of fire extinguisher necessary to provide at least minimum assurance of controlling fire caused by use of portable power tools under various climatic and fuel conditions.

The required fire tools shall at no time be farther from the point of operation of the power saw or tool than 25 feet with unrestricted access for the operator from the point of operation.

PRC Section 4442

(a) Except as otherwise provided in this section, no person shall use, operate, or allow to be used or operated, any internal combustion engine which uses hydrocarbon fuels on any forest-covered land, brush-covered land, or grass-covered land unless the engine is equipped with a spark arrester, as defined in subdivision (c), maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire pursuant to Section 4443.

(b) Spark arresters affixed to the exhaust system of engines or vehicles subject to this section shall not be placed or mounted in such a manner as to allow flames or heat from the exhaust system to ignite any flammable material.

(c) A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine that uses hydrocarbon fuels or which is qualified and rated by the United States Forest Service.

(d) Engines used to provide motive power for trucks, truck tractors, buses, and passenger vehicles, except motorcycles, are not subject to this section if the exhaust system is equipped with a muffler as defined in the Vehicle Code.

(e) Turbocharged engines are not subject to this section if all exhausted gases pass through the rotating turbine wheel, there is no exhaust bypass to the atmosphere, and the turbocharger is in effective mechanical condition.

(f) Motor vehicles when being operated in an organized racing or competitive event upon a closed course are not subject to this section if the event is conducted under the auspices of a recognized sanctioning body and by permit issued by the fire protection authority having jurisdiction.

PRC Section 4291

PRC Section 4291 establishes requirements for property owners that own, lease, control, operate, or maintain a building or structure in, upon, or adjoining any mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or any land that is covered with flammable material. *Code* Section 4291 states the following requirements:

(a) A person who owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining a mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or land that is covered with flammable material, shall at all times do all of the following:

  (1) Maintain defensible space of 100 feet from each side and from the front and rear of the structure, but not beyond the property line except as provided in paragraph (2). The amount of fuel modification necessary shall take into account the flammability of the structure as affected by building material, building standards, location, and type of vegetation. Fuels shall be maintained in a condition so that a wildfire burning under average weather conditions would be unlikely to ignite the structure. This paragraph does not apply to single specimens of trees or other vegetation that are well-pruned and maintained so as to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other

nearby vegetation. The intensity of fuels management may vary within the 100-foot perimeter of the structure, the most intense being within the first 30 feet around the structure. Consistent with fuels management objectives, steps should be taken to minimize erosion. For the purposes of this paragraph, "fuel" means any combustible material, including petroleum-based products and wildland fuels.

(2) A greater distance than that required under paragraph (1) may be required by State law, local ordinance, rule, or regulation. Clearance beyond the property line may only be required if the State law, local ordinance, rule, or regulation includes findings that the clearing is necessary to significantly reduce the risk of transmission of flame or heat sufficient to ignite the structure, and there is no other feasible mitigation measure possible to reduce the risk of ignition or spread of wildfire to the structure. Clearance on adjacent property shall only be conducted following written consent by the adjacent landowner.

(3) An insurance company that insures an occupied dwelling or occupied structure may require a greater distance than that required under paragraph (1) if a fire expert, designated by the director, provides findings that the clearing is necessary to significantly reduce the risk of transmission of flame or heat sufficient to ignite the structure, and there is no other feasible mitigation measure possible to reduce the risk of ignition or spread of wildfire to the structure. The greater distance may not be beyond the property line unless allowed by State law, local ordinance, rule, or regulation.

(4) Remove that portion of a tree that extends within 10 feet of the outlet of a chimney or stovepipe.

(5) Maintain a tree, shrub, or other plant adjacent to or overhanging a building free of dead or dying wood.

(6) Maintain the roof of a structure free of leaves, needles, or other vegetative materials.

(f) As used in this section, "person" means a private individual, organization, partnership, limited liability company, or corporation.

California Building Code

The California Business Code (CBC) includes regulations that are consistent with nationally recognized standards of good practice, intended to facilitate protection of life and property. Among other things, its regulations address the mitigation of the hazards of fire explosion, management and control of the storage, handling and use of hazardous materials and devices, mitigation of conditions considered hazardous to life or property in the use or occupancy of buildings, and provisions to assist emergency response personnel.

Chapter 7 of the CBC details the materials, systems, and assemblies used in the exterior design and construction of new buildings located within a Wildland-Urban Interface Fire Area. A Wildland-Urban Interface Area is defined in Section 702A as a geographical area identified by the areas of fire hazard severity in accordance with *PRC* Sections 4201 through 4204 and *Government Code* Sections 51175 through 51189, or other areas designated by the enforcing agency to be at a significant risk from wildfires. Fire hazard severity zones are geographical areas classified as Very High, High, or Moderate in State Responsibility Areas or as Local Responsibility Areas as Very High Fire Hazard Severity Zones. Fire hazard severity zones, which

are determined based on factors such as fuel, slope, and fire weather, do not predict when or where a wildfire will occur, but they do identify the degree of fire hazard (very high, high or moderate).

California Code of Regulations, Fire Hazard Reduction Around Buildings and Structures (Title 14, Division 1.5, Chapter 7, Subchapter 3, Article 3)

The intent of this regulation is to provide guidance for implementation of *PRC* Section 4291(a), and minimize the spread of fire within a 100-foot zone around a building or structure. These regulations would apply to the project area because it is located within a high fire hazard severity area. This regulation states the following:

> Defensible space is required to be maintained at all times, whenever flammable vegetative conditions exist. One hundred feet (100 ft.) of defensible space clearance shall be maintained in two distinct "Zones" as follows: "Zone 1" extends thirty feet (30 ft.) out from each "Building or Structure," or to the property line, whichever comes first; "Zone 2" extends from thirty feet (30 ft.) to one hundred feet (100 ft.) from each "Building or Structure," but not beyond the property line. The vegetation treatment requirements for Zone 1 are more restrictive than for Zone 2, as provided in (a) and (b) below. The Department of Forestry and Fire Protection's "Property Inspection Guide, 2000 version, April 2000," provides additional guidance on vegetation treatment within Zone 1 and Zone 2, but is not mandatory and is not intended as a substitute for these regulations.
>
> (a) Zone 1 Requirements:
>
> (1) Remove all dead or dying grass, plants, shrubs, trees, branches, leaves, weeds, and pine needles from the Zone whether such vegetation occurs in yard areas around the "Building or Structure," on the roof or rain gutters of the "Building or Structure," or any other location within the Zone.
>
> (2) Remove dead tree or shrub branches that overhang roofs, below or adjacent to windows, or which are adjacent to wall surfaces, and keep all branches a minimum of ten feet (10 ft.) away from chimney and stovepipe outlets.
>
> (3) Relocate exposed firewood piles outside of Zone 1 unless they are completely covered in a fire resistant material.
>
> (4) Remove flammable vegetation and items that could catch fire which are adjacent to or under combustible decks, balconies and stairs.
>
> (b) Zone 2 Requirements:
>
> (1) In this zone create horizontal and vertical spacing among shrubs and trees using the "Fuel Separation" method, the "Continuous Tree Canopy" method or a combination of both to achieve defensible space clearance requirements. Further guidance regarding these methods is contained in the State Board of Forestry and Fire Protection's, "General Guidelines for Creating Defensible Space, February 8, 2006," incorporated herein by reference, and the "Property Inspection Guide" referenced elsewhere in this regulation.
>
> (2) In both the Fuel Separation and Continuous Tree Canopy methods the following standards apply:
>
> (A) Dead and dying woody surface fuels and aerial fuels shall be removed. Loose surface litter, normally consisting of fallen leaves or needles, twigs, bark,

cones, and small branches, shall be permitted to a maximum depth of three inches (3 in.).

(B) Cut annual grasses and forbs down to a maximum height of four inches (4 in.).

(C) All exposed wood piles must have a minimum of ten feet (10 ft.) of clearance, down to bare mineral soil, in all directions.

(c) For both Zones 1 and 2:

(1) "Outbuildings" and Liquid Propane Gas (LPG) storage tanks shall have the following minimum clearance: ten feet (10 ft.) of clearance to bare mineral soil and no flammable vegetation for an additional ten feet (10 ft.) around their exterior.

(2) Protect water quality. Do not clear vegetation to bare mineral soil and avoid the use of heavy equipment in and around streams and seasonal drainages. Vegetation removal can cause soil erosion, especially on steep slopes. Keep soil disturbance to a minimum on steep slopes.

California Vehicle Code Section 38366

The *California Vehicle Code* Section 38366, requires spark-arresting equipment on vehicles that travel off-road. This code applies to the project area because farm and ranch vehicles work in off-road areas.

Local

Kern County Fire Department Fire Hazard Reduction Program

The Kern County Fire Hazard Reduction Program (FHRP) is a joint effort between the Kern County Fire Department, CAL FIRE, Kern County Code Enforcement, and property owners to ensure fire safe communities within the County. The program is currently administered and enforced by Kern County Fire Department personnel in accordance with Kern County Ordinance Code 8.46 and other State and federal guidelines. The goal is to provide sufficient defensible space around homes and other structures to improve the safety of the public and emergency personnel. Heavy accumulations of fuel and/or dry fuel poses a significant risk to property, neighboring properties, and fire personnel. Inspections are typically done once a year after June in preparation for the fire season. (Kern County Fire Department 2020c).

Property owners are expected to maintain their property free of fire hazards and accumulated vegetation growth throughout the year. All structures on the property, regardless of construction type or use, are required to have a minimum of 30 feet of clearance and 100 feet of fuel reduction, or to the property line if closer. Any vegetation within these zones should be ornamental trees, grass and shrubs only, and should be spaced out to allow for to discourage fire spread. For vacant properties with no structures, the requirement is to provide a minimum 10-foot fuel break along all property lines that lie within 100 feet of any structures on neighboring properties (Kern County Fire Department 2020c). In addition, property owners are required to remove accumulation of combustible fuels that can be deemed a fire hazard (Kern County Fire Department 2020d).

Kern County General Plan

The Kern County General Plan is a policy document with planned land use maps and related information designed to provide long-range guidance to County officials making decisions affecting development and the resources of the unincorporated Kern County jurisdiction (Kern County 2009). The General Plan's Safety Element addresses general safety issues, hazardous materials, wildland and urban fires, and emergency plans as discussed below.

Safety Element

The Safety Element identifies issues, goals, policies, and implementation measures to protect the community from unreasonable risks associated with general safety, hazardous materials, wildland and urban fires, and emergency plans. The applicable issues, goals, policies, and implementation measure are as follows:

General Safety Issues:

- Remote areas of the County require secondary means of access points for evacuation in case of fire or other emergency.

General Safety Goals:

Goal 1: Minimize injuries and loss of life and reduce property damage.

Goal 8: Reduce the public's exposure to fire, explosion, blowout, and other hazards associated with the accidental release of crude oil, natural gas, and hydrogen sulfide gas.

Policies and Implementation Measure that Apply to more than one Safety Constraint:

Policy 1: That the County's program of identification, mapping, and evaluating the geologic, fire, flood safety hazard areas, and significant concentrations of hydrogen sulfide in oil field areas, presently under way by various County departments, be continued.

Policy 3: That the County government encourage public support of local, State, and federal research programs on geologic, fire, flood hazards, valley fever, plague, and other studies so that acceptable risk may be continually reevaluated and kept current with contemporary values.

Implementation Measure A: All hazards (geologic, fire, and flood) should be considered whenever a Planning Commission or Board of Supervisor's action could involve the establishment of a land use activity susceptible to such hazards.

Wildland and Urban Fire

Policy 1: Require discretionary projects to assess impacts on emergency services and facilities.

Policy 3: The County will encourage the promotion of fire prevention methods to reduce service protection costs and costs to taxpayers.

Policy 4: Ensure that new development of properties have sufficient access for emergency vehicles and for the evacuation of residents.

Policy 5: Require that all roads in wildland fire areas are well marked, and that homes have addresses prominently displayed.

Policy 6: All discretionary projects shall comply with the adopted Fire Code and the requirements of the Fire Department.

Implementation Measure A: Require that all development comply with the requirements of the Kern County Fire Department or other appropriate agency regarding access, fire flows, and fire protection facilities.

Emergency Plan

Policy 1: Continue to maintain and update the Kern County Emergency Plan and continuously educate program participants of their responsibilities.

Policy 2: Monitor, enforce, and update, as appropriate, all emergency plans as needs and as conditions change.

Implementation Measure C: Require emergency plans to include procedures for traffic control and security of damaged areas.

Kern County Emergency Operations Plan

The Kern County Fire Department has prepared the Kern County Emergency Operations Plan (EOP). The most current version of the EOP, dated 2008, identifies and provides information on the hazards that Kern County is susceptible to, including wildland fire, flooding, and severe weather. The EOP includes 12 functional annexes including fire, rescue, and hazardous materials operations, logistics, debris management, and recovery operations. The EOP establishes an emergency management organization and assigns functions and tasks consistent with the California's Standard Emergency Management System (SEMS) and the National Incident Management System (NIMS). Kern County is the lead agency for the Kern Operational Area (Kern OA) addressed by the EOP and is tasked with coordination of emergency activities between the County, cities, and special districts and to serve as a communications link focusing on the collection, processing, and dissemination of vital disaster information. The EOP establishes policies, procedures, and an emergency management organization and assigns roles and responsibilities to ensure the effective management of emergency operations within Kern County and the Kern OA. This includes the planned response to disasters and supports the California Emergency Plan. Additionally, the EOP identifies sources of external support that might be provided through mutual aid and specific statutory authorities by other jurisdictions, State and federal agencies, and the private sector (KCFD 2020b).

Kern County Multi-Jurisdiction Hazard Mitigation Plan

The Kern County Multi Jurisdiction Hazard Mitigation Plan (Plan), originally adopted in November 2005, was developed by the Kern County Office of Emergency Services. An update of the Plan occurred in 2012. The Plan was prepared for the purpose of reducing or eliminating the long-term risk to people and property from natural disasters and their effects. The Plan was prepared to meet the requirements of the Disaster Mitigation Act, provide objectives based on the risk assessment to mitigate future disaster losses, and to review the County's current capabilities to reduce hazard impacts. The Plan addresses the unincorporated areas of the County, 11 incorporated municipalities, and 45 special districts including school districts, recreation and park districts, water districts, community services districts, and other districts. These have formally

adopted the November 2005 Plan. The Plan is current undergoing a required update process (KCFD 2020e).

3.17.3 Impact Analysis and Mitigation Measures

Significance Criteria

The following criteria from Appendix G of the *CEQA Guidelines* are used as thresholds of significance to determine the impacts of the proposed project as related to wildfire. The proposed project would have a significant impact if it would:

1. Substantially impair an adopted emergency response plan or emergency evacuation plan.
2. 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.
3. 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?
4. 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.
5. Result in cumulatively considerable impacts to wildfire.

Methodology

This environmental analysis of the potential impacts related to wildfire is based on the following information: the definition of the proposed project provided above in Chapter 2 *Project Description*; a review of fire hazard maps, and the regulatory framework summarized above in Section 3.17.2. The existing conditions on the project area defines the baseline conditions for the impact analysis. The analysis of the potential effects of the proposed project on wildfire is discussed below.

Impact Analysis

Emergency Response Plan

Impact 3.17-1: The proposed project could substantially impair an adopted emergency response plan or emergency evacuation plan. (*Less than Significant Impact with Mitigation*)

As discussed in Section 3.9, *Hazards and Hazardous Materials,* the KCFD EOC maintains the EOP for the area which includes information for the public about what to do if an emergency or disaster were to occur. The EOP does not identify any specific evacuation areas or routes within the project area; therefore, construction activities within the project area would not interfere with an emergency evacuation plan. However, during installation of the Kern Fan Conveyance Facilities tunneling under Interstate-5 would be required so that the water from the recharge basins could make its way to and from the California Aqueduct. As such, as explained further in Section 3.14, *Transportation,* short-term lane or road closures or detours could be required. Potential road closures or detours could congest local roadways that could be used by the public and emergency responders if an emergency or disaster were to occur. However, a Construction

Traffic Control Plan per Mitigation Measure TRA-1 would ensure that impacts to local rights-of-way do not occur as a result of the proposed project. The Construction Traffic Control Plan would include, but not be limited to, signage, striping, delineated detours, flagging operations, changeable message signs, delineators, arrow boards, and K-Rails that would be used during construction to guide motorists, bicyclists, and pedestrians safely through the construction area and allow for adequate emergency access and circulation to the satisfaction of the KCFD. The Construction Traffic Control Plan would be coordinated with the City of Bakersfield, as necessary, as well as with emergency responders, which include fire departments, police departments, and ambulances that have jurisdiction within the proposed project area.

Operation and maintenance activities for the proposed project would be substantially similar to current conditions respective to emergency response and evacuation. No operation-related activities would occur within surrounding rights-of-ways that could impair or physically interfere with an adopted emergency response plan or emergency evacuation plan. As a result, no impact would occur.

Therefore, with implementation of Mitigation Measure TRA-1, impacts to circulation system within the project area during construction of the proposed project would be reduced to a less than significant level, and project construction would not impair or physically interfere with emergency response teams or an evacuation plan. Impacts would be less than significant.

Mitigation Measures

Implement Mitigation Measure TRA-1.

Significance Determination

Less than Significant Impact with Mitigation

Exposure to Pollutant Concentrations

Impact 3.17-2: The proposed project would not, 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. ***(Less than Significant Impact)***

The majority the project area, as seen in Figure 3.17-1 does not have a fire hazard severity zone designation. The Phase 1 area and the Kern Fan Conveyance Facilities area include lands designated as a moderate fire hazard severity zone. During project construction, the operation of construction equipment and vehicles and use of combustible materials such as diesel fuel could pose a wildfire risk to people and property with possible ignition sources such as internal combustion engines, gasoline-powered tools, and equipment that could produce a spark, fire, or flame. The use of spark-producing construction machinery could expose project workers and contractors to pollutant concentrations from a wildfire resulting in a potentially significant impact. However, all personnel on the project areas would have to comply with *PRC* Sections 4427, 4428, 4431, and 4442, regulations relating to the handling of combustible fuels and equipment that can exacerbate fire risks. During construction, adherence to existing State and

local fire hazard regulations would ensure that any risk to exacerbate wildfire would be reduced. Additionally, all construction activities and crews must comply with fire protection and prevention requirements specified by the California Code of Regulations (CCR) and Cal/OSHA. This includes various measures such as easy accessibility of firefighting equipment, proper storage of combustible liquids, no smoking in service and refueling areas, and worker training for firefighter extinguisher use. The risk of construction-based ignition events could also be exacerbated by Santa Ana winds, which are known to occur in the project region. However, with compliance to the regulations discussed above, this impact would be less than significant.

Once operational, the recharge basis would either act as agricultural land or be inundated with water, posing little risk to exacerbate wildfire, even during large Santa Ana wind events. As such, impacts regarding pollutant concentrations from a wildfire or uncontrolled spread of a wildfire would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Infrastructure that Exacerbates Wildfire Risk

Impact 3.17-3: The proposed project would not 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. ***(Less than Significant Impact)***

The proposed project includes the construction and operation of recharge basins, recovery wells, and conveyance facilities as discussed in Chapter 2, *Project Description*. The potential to exacerbate wildfire risk would be limited to construction and maintenance activities, during which all personnel would be required to comply with the regulations and policies discussed above for Impact 3.17-2, to limit potential for wildfire. The use of construction equipment would adhere to CCR Title 24, the CBC, and Kern County Safety Element discussed above in Section 3.17.2. These regulations and policies provided guidance on proper operation of diesel-fueled construction equipment that could exacerbate wildfire and proper safety equipment to extinguish a fire should one become present during construction. Adherence to applicable laws and regulations would reduce impacts to a less than significant level.

Once operational the proposed project would largely resemble the existing conditions for wildfire. The recharge basins would either be agricultural lands as they are now or would be inundated with water which would reduce the potential risk for wildfire. The conveyance facilities would be either located underground or would be constructed out of nonflammable material that would not exacerbate wildfire risk. As such, project operation would not exacerbate fire risk; no impact would occur.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Post-Fire Slope or Drainage

Impact 3.17-4: The proposed project would not expose people or structures to significant risks, including downslope or downstream flooding or landslide, as a result of runoff, post fire slope instability, or drainage changes. ***(Less than Significant Impact)***

Due to the flat topography, the project area is not prone to landslides as discussed further in Section 3.7*, Geology and Soils.* The proposed project would involve the construction of berms to create recharge basins that would be approximately 3 to 6 feet above ground. In the event of a fire, the flat topographic characteristic of the proposed project area would not put structures or people at risk to post-fire landslide, flooding or slope instability. Once operational the proposed project would be designed to withstand a variety of site conditions and would be managed in a manner that would not result in runoff, post-fire slope instability, or drainage changes as a result of potential wildland fire. Impacts to structures or people due to post-fire slope or drainage changes would be less than significant.

Mitigation Measures

None Required

Significance Determination

Less than Significant Impact

Cumulative Impacts

Impact 3.17-5: Concurrent construction and operation of the proposed project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to wildfire. ***(Less than Significant Impact with Mitigation)***

This section presents an analysis of the cumulative effects of the proposed project in combination with other present and reasonably foreseeable future projects that could generate cumulatively considerable impacts to wildfire.

The geographic area affected by the proposed project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative wildfire impacts encompasses and is limited to the future project sites and their immediately adjacent area. This is due to the site specific nature of projects and their impact to wildfire such as fuels (vegetation), climate conditions, and fire history as discussed above in Section 3.17.1, *Environmental Setting.*

The proposed project would only have potential impacts during construction due to construction vehicles that use fuel contributing to potential ignition sources in the project area. During operation the proposed project would largely resemble existing conditions, and as discussed above, would not exacerbate wildfire risks significantly. As such the time frame during which the project could contribute to cumulative wildfire impacts would be only during the construction phase. Given that the proposed project would not result in potentially significant environmental impacts during its operational period, only the construction period is evaluated relative to potential cumulative impacts.

Significant cumulative impacts related to wildfire could occur if the incremental impacts of the proposed project combined with the incremental impacts of one or more cumulative projects to substantially increase wildfire risk to people or the environment. Cumulative projects would be subject to the same regulatory requirements discussed for the proposed project, including the adherence to emergency planning. Cumulative projects involving activities that could exacerbate wildfire risk would also be required to adhere to established regulatory standards for fire protection.

As described in Table 3-2 there are several cumulative projects currently under construction near the proposed project. Several of these cumulative projects are led by Rosedale and involve the implementation of groundwater banking, recharge, storage and conveyance. Ultimately, more access to water resources and more inundated recharge basins in and around the project area would reduce potential impacts of wildfire in the area.

Construction of the Kern Fan Conveyance Facilities could result in traffic related impacts to emergency response and evacuation plans as discussed above. This could cumulatively contribute impacts to the operation of emergency response or evacuation plans in conjunction with other cumulative projects in the proposed project area happening at the same time. With implementation of Mitigation Measure TRA-1 the proposed project would not create significant cumulative impacts to implementation of an emergency response or evacuation plan in conjunction with cumulative projects.

For the above reasons, the combined effects of the construction of the proposed project in combination with cumulative projects would not have a cumulatively considerable contribution to a cumulative impact. Similarly, other cumulative projects would be required to provide appropriate traffic control, emergency access, and fire safety for their projects. No significant cumulative impact related to wildfire would occur.

Mitigation Measures

Implement Mitigation Measure TRA-1.

Significance Determination

Less than Significant Impact with Mitigation

3.17.4 References

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CHAPTER 4
CEQA Plus Considerations

This Draft EIR has been prepared in accordance with the CEQA-Plus requirements of the U.S. Environmental Protection Agency (USEPA) to fulfill the requirement of potential federal funding partners to comply with the National Environmental Policy Act (NEPA). Potential federal funding partners could include U.S. Bureau of Reclamation (USBOR) or the State Water Resources Control Board (SWRCB) through the State Revolving Fund (SRF) Loan Program. The CEQA-Plus requirements have been established by the USEPA and are intended to supplement the *CEQA Guidelines* with specific requirements for environmental documents acceptable to the USBOR or SWRCB when reviewing applications for federal funding. They are not intended to supersede or replace *CEQA Guidelines*. In order to qualify for federal loan programs administered by the USBOR or the SWRCB, the proposed project must comply with the following federal cross-cutting regulations:

- Archaeological and Historic Preservation Act
- Clean Air Act
- Coastal Barriers Resources Act
- Coastal Zone Management Act
- Endangered Species Act
- Environmental Justice Executive Order
- Farmland Protection Policy Act
- Fish and Wildlife Conservation Act
- Floodplain Management
- Magnuson-Stevens Fishery Conservation and Management Act
- Migratory Bird Treaty Act
- National Historic Preservation Act
- Protection of Wetlands
- Rivers and Harbors Act
- Safe Drinking Water Act
- Wild and Scenic Rivers Act

Compliance with these federal laws and relevant executive orders are described below in Sections 4.1 and 4.2. In summary, the proposed project complies with those laws and executive orders, with further evidence provided in other sections of this Draft EIR as cross-referenced below.

4.1 Federal Regulations

4.1.1 Archaeological and Historic Preservation Act

The Archaeological and Historic Preservation Act (AHPA) also known as the Archaeological Recovery Act was passed and signed into law in 1974. The AHPA required that Federal agencies provide for "… the preservation of historical and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of … any alteration of the terrain caused as a result of any Federal construction project of federally licensed activity or program (Section 1)." (NPS 2020)

The impetus for AHPA was the destruction of archaeological sites throughout the country, frequently by actions funded or otherwise supported by Federal agencies, but not covered by the Reservoir Salvage Act, which required archeological salvage as part of dam projects (NPS 2020).

The AHPA built upon the national policy, set out in the Historic Sites Act of 1935, "… to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance …." The AHPA expanded the policy by focusing attention on significant resources and data, but does not require that they be shown to be of "national" significance. The connection between the 1935 statute and the AHPA is mentioned explicitly in the first section of the statute (NPS 2020).

Compliance with the National Historic Preservation Act (see below), and particularly the implementing regulations for Section 106, as discussed in Section 3.5 and 3.15 of this EIR, fulfill the requirements of the AHPA.

4.1.2 Clean Air Act

The federal Clean Air Act (CAA) requires the USEPA to identify National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM10, PM2.5, and lead. Pursuant to the 1990 FCAA Amendments, the USEPA classifies air basins (or portions thereof) as "attainment" or "nonattainment" for these criteria air pollutants, based on whether or not the NAAQS have been achieved. The CAA requires each state to prepare a State Implementation Plan (SIP), which is an air quality control plan that includes pollution control measures for states that violate the NAAQS. Clean Air Act compliance is described in Section 3.3 *Air Quality*. CEQA-Plus requirements include a CAA general conformity analysis for projects in a federal nonattainment area or an attainment area subject to a SIP. Kern County is designated extreme non-attainment for the federal 8-hour ozone NAAQS, attainment-maintenance for the federal CO and PM10 standards, and non-attainment serious for federal PM2.5 standards, as explained in Section 3.3 *Air Quality*. As a result, a CAA general conformity analysis has been included in Section 3.3 *Air Quality*.

4.1.3 Coastal Barriers Resources Act

The Coastal Barriers Resources Act (CBRA) was enacted in 1982 to designate relatively undeveloped coastal barriers along the Atlantic, Gulf of Mexico, Great Lakes, U.S. Virgin Islands, and Puerto Rico coasts as part of the John H. Chafee Coastal Barrier Resources System (CBRS). Those areas became ineligible for most new federal expenditures and financial assistance in order to discourage development such as federal flood insurance (USFWS 2019). The goals of the CBRA are to minimize loss of human life by discouraging development in high risk areas, to reduce wasteful expenditure of federal resources, and to protect the natural resources associated with coastal barriers (USFWS 2020). There are no designated Coastal Barrier Resources System in California. Additionally, the proposed project does not propose any development associated with coastal barriers. Therefore, this Act is not applicable to the proposed project, and no impact would occur.

4.1.4 Coastal Zone Management Act

Section 307 of the Coastal Zone Management Act (CZMA) requires activities approved or funded by the federal government that affect any land or water use or natural resource of a State's coastal zone be consistent with the enforceable policies of the State's federally approved coastal management program. California's federally approved coastal management program consists of the California Coastal Act, the McAteer-Petris Act, and the Suisun Marsh Protection Act. The California Coastal Commission (CCC) implements the California Coastal Act and the federal consistency provisions of the CZMA for activities affecting coastal resources outside of San Francisco Bay. The proposed project's facilities are not located within a State Coastal Zone and would not result in direct impacts to coastal zone natural resources. The proposed project would provide water to customers in the IRWD service area in Orange County, a portion of which is located in the State Coastal Zone. However, the proposed project would not induce growth within IRWD's service area as described in Chapter 5 of this Draft EIR, and therefore the proposed project would not have indirect impacts to coastal zone natural resources in Orange County. Therefore, this Act is not applicable to the proposed project, and no impact would occur.

4.1.5 Endangered Species Act

The purpose of the Endangered Species Act (ESA) is to protect and recover imperiled wildlife and plant species and the habitats/ecosystems upon which they depend for survival. Section 7 of the ESA requires federal agencies to use their legal and discretionary authorities to conserve and assist in the recovery of threatened and endangered species. Federal agencies are required to consult with the USFWS and/or the National Marine Fisheries Service (NMFS) to ensure actions they authorize, permit, fund, or implement are not likely to jeopardize the continued existence of the listed threatened or endangered species. To comply with the ESA, a project applicant analyzes the project's effects on threatened and endangered species, as well as any critical habitat designated for any of the species. The applicant uses biological assessments that have been prepared for the project, as well as any documents pertaining to the project's effects on listed species and designated critical habitat. If a listed species may be adversely affected by a project, USBOR or SWRCB staff will confer with the USFWS and/or the NMFS to inform these agencies of project impacts to any federally listed species or critical habitat. If USFWS and/or NMFS staff

determine the project may adversely impact a federally listed species or designated critical habitat, formal consultation is initiated, where USEPA assumes the role as the lead agency. Section 3.4, *Biological Resources*, of this EIR includes the documentation to disclose the proposed project's effects on special-status species and support consultation with USFWS and/or NMFS as required by Section 7 of the ESA.

4.1.6 Farmland Protection Policy Act

The purpose of the Farmland Protection Policy Act (FPPA) is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. It additionally directs federal programs to be compatible with State and local policies for the protection of farmlands. For the purpose of the FPPA, farmland includes Prime Farmland, Unique Farmland, and Land of Statewide or Local Importance. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency (NRCS 2020). As discussed in Section 3.2, *Agriculture and Forestry Resources*, the proposed project area includes Prime Farmland, Farmland of Statewide Importance, and Unique Farmland as designated by the CDC Farmland Map for Kern County. However, the proposed project would be consistent with land uses for farmland and would not result in the conversion of land designations provided by the FPPA to non-agricultural uses. Further discussion about the proposed project and agricultural resources can be found in Section 3.2 *Agriculture and Forestry Resources*.

4.1.7 Fish and Wildlife Conservation Act

The Fish and Wildlife Conservation Act declares that fish and wildlife are of ecological, educational, aesthetic, cultural, recreational, economic, and scientific value to the United States. The purposes of this Act are to encourage all federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities and to conserve and to promote conservation of non-game fish and wildlife and their habitats. Another purpose is to provide financial and technical assistance to the states for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife. Fish and Wildlife Conservation Act compliance is described in Section 3.4, *Biological Resources*, of this EIR.

4.1.8 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) is the principal law governing marine fisheries in the U.S. First enacted in 1976, it was adopted to create a U.S. fishery conservation zone out to 200 nautical miles off the U.S. coast, to phase out foreign fishing activities within this zone, to prevent overfishing, to allow overfished stocks to recover, and to conserve and manage fishery resources. MSA requires federal agencies to consult with the National Oceanic and Atmospheric Administration (NOAA) Fisheries when their actions or activities may adversely affect habitat identified by federal regional management councils as Essential Fish Habitat (EFH). The MSA defines EFH as "those waters and substrate necessary to

fish for spawning, breeding, feeding, or growth to maturity" (NOAA Fisheries 2020). The proposed project would have no adverse impact on the marine environment or EFH in the Pacific Ocean. The proposed project is located approximately 70 miles northeast of the Pacific Ocean, and no project component includes discharge to the Pacific Ocean which could potentially impact EFH's. Therefore, the MSA is not applicable to the proposed project, and no impact would occur.

4.1.9 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) is the domestic law that affirms, or implements, a commitment by the U.S. to four international conventions (with Canada, Mexico, Japan, and Russia) for the protection of a shared migratory bird resource. The MBTA makes it unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, or kill migratory birds. The law also applies to the removal of nests occupied by migratory birds during the breeding season. The MBTA makes it unlawful to take, pursue, molest, or disturb these species, their nests, or their eggs anywhere in the United States. The proposed project's compliance with the MBTA is described in Section 3.4, *Biological Resources*, of this EIR.

4.1.10 National Historic Preservation Act

CEQA-Plus requires compliance with Section 106 of the National Historic Preservation Act (NHPA). Consultation with the State Historic Preservation Officer (SHPO) is required to demonstrate/confirm that Section 106 compliance has been achieved. This EIR and the administrative record includes the information and documentation that is required to provide to the SHPO to initiate the Section 106 consultation, including, (1) identification of the proposed project's Area of Potential Effects (APE), (2) cultural records searches for the APE at the appropriate Information Centers, (3) documentation of Native American consultation, (4) cultural resources field surveys of the APE, (4) evaluations of elements of the built environment in and around the APE that are eligible for the National Register of Historic Places, and (5) Determination of Eligibility for any cultural resources that cannot be avoided during project construction. Compliance with the NHPA is discussed in this EIR in Section 3.5, *Cultural Resources*, and Section 3.15, *Tribal Cultural Resources*.

4.1.11 Rivers and Harbors Act

Section 9 of the Rivers and Harbors Appropriation Act of 1899 (33 *U.S.C.* 403; Chapter 425, March 3, 1899; 30 Stat. 1151), commonly known as the Rivers and Harbors Act of 1899, prohibits the construction of any bridge, dam, dike or causeway over or in navigable waterways of the U.S. without Congressional approval. Under Section 10 of the Act, the building of any wharfs, piers, jetties, and other structures is prohibited without Congressional approval, and excavation or fill within navigable waters requires the approval of the Chief of Engineers. The proposed project does not entail the construction of any bridges, dams, dikes, causeways, wharfs, piers, or jetties on any federally-designated navigable water. As such, this Act is not applicable to the proposed project, and no impact would occur.

4.1.12 Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the United States. The SDWA focuses on all waters actually or potentially designed for drinking uses, whether from above ground or underground sources. The principal federal agency involved in drinking water regulation is the USEPA. USEPA is responsible for implementing federal drinking water law and setting national drinking water requirements. Under the SDWA, the USEPA sets minimum drinking water quality standards. In California, the SWRCB's Division of Drinking Water (DDW) regulates public drinking water systems. DDW works with county environmental health departments to regulate drinking water suppliers through a permit program with monitoring and reporting requirements that enforce water quality standards.

The proposed project would not be regulated directly by the SDWA. However, the proposed project would involve the storage of groundwater to be pumped and used at a later time for agricultural irrigation or as raw water for potable M&I uses after being treated. As discussed in Section 3.10, *Hydrology and Water Quality*, once recovered, groundwater would be subject to the pump-in water quality requirements of regional water conveyance systems such as the California Aqueduct or the CVC. Any water that does not meet water quality requirements or cannot be blended to meet such requirements, as imposed by the conveyance facility operators, would not be conveyed within the canals or conveyance facilities. Water would then be delivered to treatment plants that would be regulated by the SDWA through DDW and county agencies that regulate drinking water quality.

4.1.13 Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act was created in 1968 to protect and preserve the special character of certain rivers with outstanding natural, cultural and recreational values and recognize their appropriate use and development. Section 5(d)(1) of the Wild and Scenic Rivers Act lists interim protection measures for eligible or suitable rivers. For a river to be eligible for designation in the National Wild and Scenic River System, it must have one or more outstandingly remarkable river values. The Kern River is a designated by the National Wild and Scenic Rivers System, however, the portions of the River designated are located further upstream of the project site in the Sequoia National Forest. The parameters of the portions of the Kern River designated under the Wild and Scenic River System are as follows, for the North Fork from the Tulare-Kern County line to its headwaters in Sequoia National Park and for the South Fork from its headwaters in the Inyo National Forest to the southern boundary of the Domelands Wilderness in the Sequoia National Forest. While the Phase 1 project area is in close proximity to the Kern River, it would not be near the portion of the Kern River discussed above. As such, there are no Wild and Scenic Rivers located within the project area (National Wild and Scenic River System 2020). Therefore, this Act is not applicable to the proposed project, and no impact would occur.

4.2 Executive Orders

4.2.1 Floodplain Management, Executive Order No. 11988

Executive Order 11988 requires federal agencies avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative (FEMA 2020b). If a project has a potential impact to or within a floodplain, there is an eight-step process that agencies can carry out during their decision-making process on the project. The eight-step process includes: (1) determine if a proposed action is in the base floodplain or area which has a one percent or greater chance of flooding in any given year, (2) conduct early public review, (3) identify and evaluate practicable alternatives to locating in the base floodplain, (4) identify impacts of the proposed action, (5) develop measures to minimize the impacts and restore and preserve the floodplain if impacts cannot be avoided, (6) re-evaluate the alternatives, (7) present the findings and a public explanation, and (8) implement the action (FEMA 2020b).

As discussed in Section 3.10, *Hydrology and Water Quality*, the proposed project is not located within a 100-year flood zone as designated by FEMA and does not include the construction or renovation of any habitable or occupied structures or housing units. Refer to Section 3.10 for further discussion of the proposed project components in the floodplain and potential impacts and mitigation measures.

4.2.2 Protection of Wetlands, Executive Order No. 11990, as amended by Executive Order No. 12608

Under this Executive Order No. 11990, each Federal agency takes action to minimize the destruction, degradation, or modification of wetlands and enhance the natural and beneficial values of wetlands. The Executive Order also directs the avoidance of direct or indirect support of new construction in wetlands and public involvement throughout the wetlands protection decision-making process (HUD 2020). Impacts to wetlands in the project area are described in Section 3.4, *Biological Resources*, of this EIR.

4.2.3 Environmental Justice, Executive Order No. 12898

Under Executive Order 12898, federal agencies are directed to make achieving environmental justice a part of their mission by identifying and addressing, as appropriate, disproportionately high adverse human health or environmental effects of its activities on minority and low-income populations (FEMA 2020a). Per Executive Order 12898, each federal agency must make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health, environmental, economic and social effects of its programs, policies, and activities on minority and low-income populations, particularly when such analysis is required by NEPA. The Executive Order emphasizes the importance of NEPA's public participation process, directing that each federal agency shall provide opportunities for community input in the NEPA process. Agencies are further directed to identify potential effects and mitigation measures in consultation with affected communities. An Environmental Justice

Analysis is included in Section 4.3 below for the proposed project per the guidelines set above to comply with federal cross cutting regulations required to receive federal funding.

4.3 Environmental Justice Analysis

The following section discusses the environmental justice issues pertaining to the proposed project and evaluates the potential for the proposed project to disproportionately affect minority and low-income populations. Data presented in this section was obtained from the 2010 U.S. Census by the U.S. Census Bureau.

4.3.1 Environmental Setting

Potentially Affected Populations

The study area for environmental justice effects includes areas that may experience adverse human health or environmental effects resulting from construction and operation of the proposed project. The proposed project would be located in western Kern County, west of the City of Bakersfield. The study area for this analysis of environmental justice includes the project areas as well as the Rosedale service area. **Table 4-1** and **Table 4-2** list the census tracts potentially affected by the proposed project. The tracts are also shown in **Figure 4-1**.

TABLE 4-1
DEMOGRAPHIC INFORMATION FOR CENSUS TRACTS WITHIN THE STUDY AREA (2010)

Census Tract	Black or African American Alone, Not Hispanic or Latino	Asian Alone, Not Hispanic or Latino	Hispanic or Latino (of Any Race)	Total Minority[a,b]
CT 32.03	4%	0%	21%	27%
CT 32.04	5%	15%	26%	46%*
CT 37.00	4%	0%	59%	**66%***
CT 38.03	0%	0%	20%	27%
CT 38.04	4%	6%	30%	43%*
CT 38.09	2%	3%	26%	33%
CT 38.10	2%	6%	10%	21%
CT 38.11	0%	0%	25%	25%
CT 38.13	5%	8%	21%	36%

NOTES:

CT = census tract

[a] Numbers in bold and italics represent tracts where greater than 50 percent of the total population is represented by minority population.

[b] Numbers with asterisk (*) represent tracts where the minority population is meaningfully greater than the total minority population of the city.

SOURCE: U.S. Census Bureau 2010.

TABLE 4-2
INCOME AND POVERTY FOR CENSUS TRACTS WITHIN THE STUDY AREA (2010)

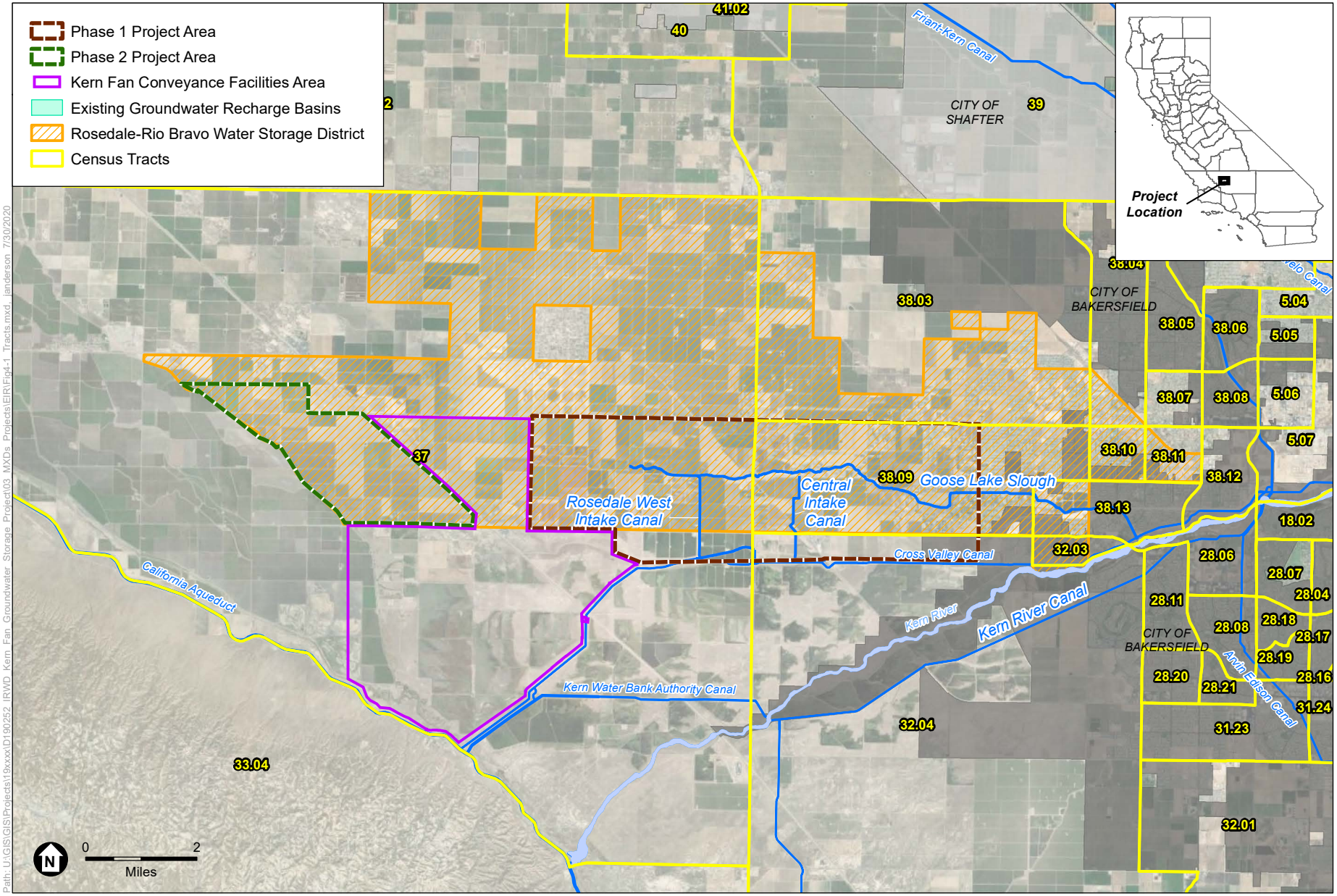
Geography	Mean Household Income	Percentage of Individuals with Family Income below Poverty Threshold[a]
CT 32.03	$100,749	1.8%
CT 32.04	$129,076	6.9%
CT 37.00	$58,154	17.2%
CT 38.03	$121,837	2.4%
CT 38.04	$100,352	2.6%
CT 38.09	$129,388	7.8%
CT 38.10	$173,472	0%
CT 38.11	$72,707	4.7%
CT 38.13	$107,503	1.8%

NOTES:
CT = census tract
[a] Numbers in bold and italics denote disadvantaged communities and low-income populations.
SOURCE: U.S. Census Bureau 2010.

Minority Populations

According to the federal Council on Environmental Quality (CEQ) guidelines for environmental justice analyses (CEQ 1997), minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is "meaningfully greater" than the majority population percentage in the general population or other appropriate unit of geographic analysis. CEQ guidance does not define the term "meaningfully greater;" however, the Federal Interagency Working Group on Environmental Justice NEPA Committee's *Promising Practices for EJ Methodologies* (FIWGEJ 2016) suggests that the 50 percent approach and the "meaningfully greater" approach should be used together, and that "[t]he Meaningfully Greater analysis requires use of a reasonable, subjective threshold (e.g., ten or twenty percent greater than the reference community)." This analysis embraces the NEPA Committee's advice on this approach.

Information regarding racial and ethnic diversity in the study area was derived from the 2010 census by the U.S. Census Bureau. The Rosedale service area has a total minority population of 39 percent, which is less than 50 percent and thus, as a reference population, does not represent a minority population (US Census Bureau 2010). Populations are diverse across census tracts with variability in the amount of minority population in every tract. Only one tract in the Rosedale service area is predominantly a minority population; Census Tract 37 is defined by a minority population of 66%. This tract contains the entirety of the Phase 2 project area, the entire Kern Fan Conveyance Facility area, and portions of the Phase 1 project area. While Census Tract 37 is amongst the largest in geographic size within the Rosedale service area, it is the fourth smallest in population size accounting for only 7% of the entire service area population.



SOURCE: ESRI; Kern County

Kern Fan Groundwater Storage Project

Figure 4-1

Census Tracts

ESA

Selected racial and ethnic characteristics of census tracts within the study area are summarized in Table 4-1. The final column in Table 4-1 presents the "total minority" population percentage.

Because the Rosedale service area has a minority population less than 50 percent, the "meaningfully greater" approach is used here to identify minority populations that exceed the percentage of the service area. As explained above, no official threshold defines this term, and a lead agency must select a threshold that provides a reasonable and meaningful basis of comparison. Given the range of minority population concentrations within the service area, an inclusive threshold is used to acknowledge areas of particularly high minority populations: any census tracts within the potential area of environmental impact that have concentrated minority populations greater than the overall service area's 39% is considered to be "meaningfully" greater. Three census tracts meet this criteria, Census Tract 37, discussed above, and Census Tracts 32.04 and 38.04.

Low-Income Populations

The CEQ environmental justice guidance states that "…low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty" (CEQ 1997, page 25). USEPA guidance (1998) recommends the use of Census data on poverty income as one indicator, as well as other available data. Unlike the CEQ guidance on minority populations, none of the environmental justice guidance documents contains a quantitative definition of what proportion of low-income individuals defines a low-income population. The annual statistical poverty thresholds are based on family income. A threshold of 50 percent of individuals in families with incomes below the poverty threshold (similar to the 50 percent threshold used to identify a minority population) would be an overly restrictive threshold for identifying a low-income population due to the nature of the poverty thresholds, which are not adjusted for regional costs of living, and are below levels commonly considered low-income in many areas of California.

For the purposes of this environmental justice analysis, the method of identifying low-income populations within the study area must account for regional costs of living. Therefore, this analysis uses a comparative approach and identifies a low-income population if the proportion of people with family incomes below the poverty threshold is greater than that within the general population; in other words, if the percentage of such people in any of the communities considered is greater than 20.5 percent, which is the poverty rate in Kern County (US Census Bureau 2019). Additionally, California's Integrated Regional Water Management guidelines provide criteria for identifying "disadvantaged communities" during water resources planning efforts. Under the California Water Code, a disadvantaged community is defined as one with an annual median household income that is less than 80 percent of the Statewide median household income (*California Water Code*, Section 79505.5[a]). The Statewide median household income during 2010 when the census tract data was gathered was $59,540. Therefore, the threshold of 80 percent of the Statewide median is $47,632. As shown in Table 4-2, there are no census tracts within the service area that have mean incomes below this figure, and are therefore identified as disadvantaged communities and low-income populations, as shown in Table 4-2.

Between the two approaches to identify low-income communities in the Rosedale service area, no such communities were identified. As such, the potential disproportionate impact to low-income communities in the project area and Rosedale service area will not be discussed further.

4.3.2 Significance Thresholds and Criteria

For the purposes of this EIR and consistency with NEPA and CEQA-Plus Guidelines, applicable local plans, and agency and professional standards, the proposed project would be considered to have a significant effect on environmental justice if it would:

- Affect the health or environment of minority or low-income populations disproportionately.

4.3.3 Impacts and Mitigation Measures

As discussed above, the study area analyzed for environmental justice impacts does not contain a relative low-income population based on the criteria set out above in Section 4.3.1. As such, the proposed project does not have the potential to affect the health or environment of low-income populations disproportionately. There would be no impact.

However, within the study area, there are three census tracts that contain a meaningfully greater minority population (greater than 39 percent). Census Tract 37 contains a minority community of 66% and also includes all areas where the proposed project would occur: portions of the Phase 1 area, the entire Phase 2 area, and the entire Kern Fan Conveyance Facilities area. In addition, there are two other Census Tracts within the study area that contain meaningfully greater minority communities, Census Tracts 32.04 and 38.04 with minority populations of 46 and 43 percent, respectively. Census Tract 32.04 includes a small portion of the southeast corner of the Phase 1 area. Census Tract 38.04 does not include any portion of the project areas and thus is not discussed further.

While the proposed project would be located in census tracts that contain minority populations, the environmental impacts associated with construction, operation, and maintenance activities would not have significant effects on the environment or public health. Based on the analyses of impacts provided in Chapter 3 of this EIR, the proposed project would not have significant effects to air quality, noise, traffic, water quality, water supply, or due to hazard or hazardous materials. A summary of these analyses is provided below.

Air Quality. As discussed in Section 3.3, *Air Quality*¸ there is potential for significant air quality impacts to occur during construction of the proposed project. The emissions generated by the operation of project construction equipment could exceed established emission standards for NOx. Implementation of Mitigation Measure AIR-1 would reduce air emissions of NOx below the thresholds set by SJVAPCD, such that impacts to air quality in Census Tract 37 and 32.04 would be less than significant. Mitigation Measure AIR-1 would require certain features on construction equipment to reduce emissions that would have adverse impacts to air quality. These features include the utilization of off-road diesel-powered construction equipment that meet or exceed CARB and USEPA Tier 4 Interim or better off-road emissions standards for equipment rated at 50 horsepower (hp) or greater; this equipment would be outfitted with BACT devices

including a CARB certified Level 3 Diesel Particulate Filter or equivalent. As a result, the air quality of Census Tract 37 and 32.04 would not be significantly affected by the proposed project, and the population of these census tracts would not be disproportionately affected by the proposed project.

Hazards and Hazardous Materials. As discussed in Section 3.9, *Hazards and Hazardous Materials*, there is potential for significant hazard impacts to occur during project construction. The routine use or an accidental spill of hazardous materials such as fuels, oils, and lubricants could result in inadvertent releases, which could adversely affect construction workers, the public, and the environment, during potential demolition and construction phases. In addition, as with many former agricultural properties, it is possible that irrigation lines on the property may contain asbestos or be wrapped in asbestos. If these irrigation lines are reused or demolished, asbestos materials may pose an adverse impact to the workers and the environment. However, implementation of both Mitigation Measure HAZ-1 and HAZ-2 would reduce these impacts in the project area, and in turn Census Tract 37 and 32.04, to less than significant levels. Mitigation Measure HAZ-1 would require samples of soils onsite to be analyzed and appropriately remediated or removed if the soils contain hazardous quantities of contaminants. This would reduce any potential impacts to construction workers due to encounters with hazardous materials to less than significant levels and reduce impacts to groundwater due to potential transport of hazardous substances during recharge activities. Furthermore, if asbestos-containing materials are uncovered during construction, Mitigation Measure HAZ-2 would require all work at the project sites to halt so that a proper assessment can be made and proper worker protection measures can be implemented.

There are six active oil and well fields within the project area. In the event that facilities would be located on a site that contains an active oilfield, impacts to the environment resulting from spillage, releases, and disposal of oil associated with oilfield production and storage may have occurred in the past or could occur during construction. Active wells could have also released hazardous materials that migrated beyond the boundaries of the oilfield within the project area. This could potentially expose construction workers to potential hazardous substances or introduce hazardous substances to groundwater during recharge operations. However, Mitigation Measure HAZ-3 would require the completion of a Phase I ESA to ensure hazards and appropriate mitigation measures are identified within the project sites prior to construction, thereby reducing potential impacts in the project area, and in turn Census Tract 37 and 32.04, to less than significant levels.

The routine use or an accidental spill of hazardous materials described above could result in inadvertent releases of hazardous contaminants within one-quarter mile of a school during demolition and construction phases. Mitigation Measure HAZ-4 would require coordination with the Rio Bravo-Greeley Union School District and any affected schools to determine a haul route that would not impact existing school safety routes. Additionally, there is potential for project facilities to be placed on or near hazardous material sites; however, Mitigation Measures HAZ-1 through HAZ-3, in addition to Mitigation Measure HAZ-4 and HAZ-5 would reduce potential impacts in the project area, and in turn, Census Tract 37 and 32.04, to less than significant levels.

Last, during construction, potential road closures or detours could congest local roadways that could be used by the public and emergency responders if an emergency or disaster were to occur, which could result in potentially significant impacts to Census Tracts 37 and 32.04. To ensure that impacts to local rights-of-way do not occur as a result of the proposed project, implementation of Mitigation Measure TRA-1 would require the preparation and implementation of a Construction Traffic Control Plan. The Construction Traffic Control Plan could include signage, striping, or during construction to guide motorists, bicyclists, and pedestrians safely through the construction area and allow for adequate emergency access. Therefore, with implementation of Mitigation Measure TRA-1, impacts to circulation system within the project area would be reduced to a less than significant level, thereby reducing impacts to Census Tracts 37 and 32.04.

The implementation of Mitigation Measures HAZ-1 through HAZ-4 and TRA-1 would ensure that Census Tract 37 and 32.04 would not be significantly affected by hazardous materials or traffic/safety hazards as a result of construction of the proposed project. The population of these census tracts would not be disproportionately affected by the proposed project.

Noise. As discussed in Section 3.13, *Noise*, there is potential for significant noise impacts to occur during project construction. Well drilling would result in drilling overnight, which may result in temporary noise level increases outside of normally acceptable construction hours and within 1,000 feet of occupied residential dwellings. However, Mitigation Measure NOI-1 would require construction contractors to move 24-hour drilling over 1,000 feet away from occupied residential dwellings, which include residents within Census Tracts 37 and 32.04. If moving the well location is not possible, a Noise Control Plan containing best management practices (BMPs) would be developed and implemented to minimize exposure to high levels of noise and ensure compliance with the Kern County Noise Ordinance. Implementation of BMPs, such as installation of portable acoustic panels between the construction zone and the occupied residential dwellings, would ensure that Census Tract 37 and 32.04 would not be significantly affected by noise as a result of construction of the proposed project. The population of these census tracts would not be disproportionately affected by the proposed project.

Transportation. As discussed in Section 3.14, *Transportation*, there is potential for significant traffic and transportation impacts to occur during project construction. Construction of the Kern Fan Conveyance Facilities may require short-term lane or road closures on local surface roadways or detours within Census Tracts 37 and 32.04 as conveyance facilities are constructed, which could lead to safety issues, inadequate emergency access or congestion on the local roadways. However, implementation of Mitigation Measure TRA-1 would require preparation and implementation of a Construction Traffic Control Plan, as described above within the Hazardous and Hazardous Materials discussion above. Mitigation Measure TRA-1, in conjunction with Mitigation Measure HAZ-4 discussed above would also reduce this risk of congestion or roadway safety near schools. Implementation of these mitigation measures would reduce impacts of traffic and transportation to the minority population Census Tracts 37 and 32.04 to less than significant levels. The population of these census tracts would not be disproportionately affected by the proposed project.

Water Quality. As discussed in Section 3.10, *Hydrology and Water Quality*, there is potential for residual pesticides to be transported to the groundwater by the recharge water in basins. Construction of the proposed project would require a NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (Construction General Permit). Compliance with this permit would require the preparation and implementation of a SWPPP that would identify pollutant sources that may affect the quality of storm water discharge and implement BMPs, such as erosion control and pollution prevention measures, to be used during the course of construction. The project SWPPP would include BMPs to minimize the impacts of construction activities to water quality. With implementation of the BMP requirements required by the state Construction General Permit, the potential for pollutants and sediment to affect the water quality of runoff from construction sites would be minimized to less-than-significant levels within the project area, and in turn within Census Tracts 37 and 32.04. Furthermore, implementation of Mitigation Measure HAZ-1 would require that samples of soils at new recharge basins are analyzed and removed appropriately if soils contain hazardous quantities of contaminants. Therefore, potential impacts to water quality within the area of Census Tracts 37 and 32.04 would be considered less than significant with the implementation of Mitigation Measures HAZ-1. The population of these census tracts would not be disproportionately affected by the proposed project.

The proposed project would be subject to strict water quality regulations. After project implementation, water quality of the surface source waters would generally be better than the water quality of groundwater in the aquifer, and the recharge of surface water into the aquifer would improve groundwater quality. Once recovered, groundwater would be subject to the pump-in water quality requirements of regional water conveyance systems such as the California Aqueduct. Any water that does not meet water quality requirements or cannot be blended to meet such requirements, as imposed by the conveyance facility operators, would not be conveyed within the canals or conveyance facilities.

Water Supply. As discussed in Section 3.10, *Hydrology and Water Quality*, by storing additional surface water underground in Kern County, the proposed project would enhance water supply reliability by augmenting supplies for periods when other sources may be limited or unavailable. By storing additional surface water underground in Kern County, the proposed project would generally benefit groundwater levels and storage in the Sub-basin and help support groundwater sustainability efforts. Therefore, Census Tracts 37 and 32.04's water supply would benefit from implementation of the proposed project.

As discussed in Section 3.10, *Hydrology and Water Quality*, the proposed project also could cause temporary declines in groundwater levels during groundwater recovery events. The groundwater modeling conducted to estimate impacts of operating the proposed 12 recovery wells indicates that neighboring wells within Census Tracts 37 and 32.04 could experience up to 20 feet of decline in groundwater levels if groundwater pumping were to occur during periods of low groundwater levels, such as those experienced during 2015 and 2016. However, based on the criteria established in Rosedale's Long Term Operations Plan, a decline of 20 feet would not be considered a significant impact and would not affect the operation of neighboring wells and the ability to provide water supply to these census tracts. In addition, if the proposed project were to

result in the drawdown of groundwater levels up 30 feet or more at neighboring wells relative to the baseline conditions without the project (no-project condition), the threshold in the Long Term Operations Plan would be triggered and the Authority would implement measures as applicable and specified in the Long Term Operations Plan to ensure the wells remains operable. Therefore, impacts to water supply in Census Tracts 37 and 32.04 would be less than significant. The population of these census tracts would not be disproportionately affected by the proposed project.

Summary

Overall, implementation of the proposed project would not result in any potential significant impacts that could not be reduced to less than significant levels with the implementation of mitigation measures, as analyzed throughout Chapter 3 of this EIR. The adverse environmental effects of the proposed project that have potential to result in adverse effects to public health and environment would occur primarily during construction of the proposed project. The census tract that would be most affected by the proposed project would be Census Tract 37, which contains the vast majority of the project area. However, with the implementation of Mitigation Measure AIR-1, HAZ-1 through HAZ-5, NOI-1, TRA-1, and the other mitigation measures discussed in this EIR, the minority community of Census Tract 37 would not experience significant impacts to health or the environment due to implementation of the proposed project. Once the proposed project is operational, there would be no adverse effects to public health or the environment; rather the proposed project would have beneficial impacts to water supply sustainability, agriculture, and intermittent wetland habitat.

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CHAPTER 5
Growth Inducement

5.1 Overview

The *California Environmental Quality Act (CEQA) Guidelines* (Section 15126.2(e)) require that an EIR discuss the potential growth-inducing impacts of a proposed project. The *CEQA Guidelines* provide the following guidance for such discussion:

> *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 (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic 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.*

A project can have direct and/or indirect growth-inducement potential. Direct growth inducement would result if a project involves construction of new housing. A project can have indirect growth-inducement potential if it establishes substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises) or if it involves a construction effort with substantial short-term employment opportunities that indirectly stimulates the need for additional housing and services to support the new employment demand. Similarly, under CEQA, a project would indirectly induce growth if it removes an obstacle to additional growth and development, such as removing a constraint on a required public service.

Water storage and supply is one of the primary public services needed to support growth and community development. While water supply plays a role in supporting growth, it is not the single determinant of such growth. Other factors, including general plan policies, land use plans and zoning, the availability of wastewater treatment and solid waste disposal capacity, public schools, transportation services, and other essential public infrastructure, also influence business and residential population growth. Economic factors, in particular, greatly affect development rates and locations.

Growth inducement itself is not necessarily an adverse environmental impact. It is the potential consequences of growth, the secondary effects of growth, which may result in environmental

impacts. Potential secondary effects of growth include increased demand on other public services; increased traffic and noise; degradation of air quality; loss of plant and animal habitats; and the conversion of agriculture and open space to developed uses. Growth inducement may result in adverse impacts if the growth is not consistent with the land use plans and growth management plans and policies for the area, as "disorderly" growth could indirectly result in additional adverse environmental impacts. Thus, it is important to assess the degree to which the growth accommodated by a project would or would not be consistent with applicable land use plans.

As stated in Chapter 2, *Project Description*, the proposed project would capture, recharge and store water from the SWP, CVP, and other available water supplies for later use through the construction and operation of water conveyance, recharge and recovery facilities. This water would provide ecosystem public benefits, emergency water supply public benefits during extended droughts or a Delta levee failure, and water supply benefits for agricultural, M&I and federal wildlife refuge use. The proposed project would assist in achieving groundwater sustainability within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin through implementation of projects consistent with California Executive Order N-10-19 directing state agencies to develop a "water resilience portfolio." The project would also provide operating flexibility for Rosedale's existing and future conjunctive use programs, as well as provide Rosedale and IRWD customers and partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted.

This chapter evaluates the potential for the proposed project to induce growth in the Rosedale and IRWD service areas. This chapter reviews the population growth projections for the Rosedale and IRWD service areas and describes the existing and projected water demand and water supply conditions. It provides a description of Rosedale's and IRWD's role in providing water to customers within their service areas and evaluates the potential for the proposed project to induce growth, both directly and indirectly.

5.2 Population Projections

5.2.1 Rosedale

Rosedale is located west of Bakersfield and encompasses approximately 44,150 acres in Kern County, California, with 27,500 acres developed as irrigated agriculture and approximately 7,500 acres developed for urban uses. Rosedale's service area overlies the Kern County Sub-basin of the larger San Joaquin Valley Groundwater Basin, and was established in 1959 to develop a groundwater recharge program to offset overdraft conditions in the underlying sub-basin. Rosedale currently manages more than 500,000 AF of stored water in the underlying sub-basin, which has an estimated total storage capacity in excess of 1.7 million AF.

The Rosedale service area consists predominately of rural agricultural land uses. Eastern portions of Rosedale's service area are within the Metropolitan Bakersfield Planning Area within the designated City of Bakersfield Sphere of Influence (SOI) and are experiencing development and population growth. Based on the Kern Council of Governments (COG) most recent Regional Transportation Plan (RTP), the population in Metropolitan Bakersfield grew by 10,093 persons, or 2.6 percent annually, from the years 1980 to 2017, resulting in the estimated 598,900-person

population in 2017. The total population for the City of Bakersfield in 2017 was 383,512, approximately 64 percent of the Metropolitan Bakersfield Planning Area (CA Department of Finance 2017). The RTP projects that the population in Metropolitan Bakersfield will continue to grow by 13,651 people-per-year, or at a reduced rate of 1.8 percent annually, from the years 2017 to 2042. These growth rate projections for 2042 would result in Metropolitan Bakersfield increasing to a population of 764,900 by 2030 and 947,000 by 2042 (Kern COG 2018).

5.2.2 IRWD

IRWD is a multi-service agency responsible for providing domestic water service, sewage collection and treatment, water recycling, and urban runoff natural treatment in Central Orange County, California. IRWD provides water service to approximately 422,000 residents as of 2019 (IRWD 2019). IRWD encompasses approximately 181 square miles extending from the Pacific Coast to the foothills of the Santa Ana Mountains, covering elevations ranging from sea level to 1,700 feet. IRWD services the City of Irvine and portions of Costa Mesa, Lake Forest, Newport Beach, Orange, Tustin, Santa Ana and unincorporated areas of Orange County.

The IRWD service area is located within the jurisdiction of the Southern California Association of Governments (SCAG). SCAG consists of local governments from Orange, Ventura, San Bernardino, Los Angeles, Riverside, and Imperial Counties. One of SCAG's primary functions is to forecast population, housing, and employment growth for each region, subregion, and city within its jurisdiction. SCAG recently adopted the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) which acts as a long-term planning and management tool for the regional transportation system, providing mitigation measures to off-set the impacts of projected growth. The northern portion of Orange County was extensively developed in the 1970s and 1980s. In the period from 2000 to 2018, Orange County population density grew at a 13.2 percent, which was lower than the SCAG regional average during that time (SCAG 2019). According to SCAG, the population projection of the City of Irvine, which is the main city serviced by IRWD, is anticipated to increase approximately 10 percent from 296,300 people in 2020 to 327,300 in 2040 (SCAG 2016).

As explained in IRWD's 2015 Urban Water Management Plan (UWMP), the majority of the development within the IRWD service area follows the City of Irvine General Plan first adopted in 1973 (as amended). The remainder of IRWD's service area follows the appropriate city General Plan or projections from the County of Orange. As explained in IRWD's 2015 UWMP, "these plans establish a guideline for land use development within the IRWD service area and serve to coordinate the timing of future growth." Population projections for the IRWD service area were obtained from the IRWD's 2015 UWMP. The UWMP takes into account the projected population growth for the water supplier's service area when determining future available water supply and future anticipated water demand. According to IRWD's 2015 UWMP, IRWD's service area population is anticipated to increase approximately 8.8 percent from 440,981 in 2020 to 479,783 in 2035 (IRWD 2016).

5.3 Water Supply and Demand

5.3.1 Rosedale

Currently, the Rosedale service area contains approximately 44,000 acres of land, of which approximately 27,500 acres are utilized for irrigated agriculture and approximately 7,500 acres are developed for residential, commercial and industrial uses. The urban development is primarily located in the eastern end of the Rosedale's service area and is anticipated to increase as the city develops to the west (Rosedale 2019). Water use in Rosedale varies from year to year depending on the crops that are grown and the amount of land that remains fallow. However, as more permanent crops are grown and more land is converted to urban development, the fluctuations in water use have become less pronounced (Rosedale 2019).

Rosedale has entered into long-term contracts for delivery of surface water supplies from the Kern River and the SWP and short-term contracts for water from the Friant Kern Canal (which is part of the U.S. Bureau of Reclamation Central Valley Project) (Rosedale 2019). Rosedale's long-term contract with the Kern County Water Agency is for 29,900 AFY from the SWP (Rosedale 2019). However, the amount of SWP water delivered to Rosedale has been significantly diminished to a long-term average of approximately 60 percent of the contracted amount due to environmental and legal restrictions on pumping water from the Sacramento-San Joaquin Delta (Rosedale 2019). Rosedale has an agreement with owners of interest in the waters of the Kern River that contributes 10,000 AFY to the Rosedale water supply, plus other supplies the amount of which varies. Temporary contracts with the Bureau of Reclamation for the Friant-Kern floodwaters, Kern River flood flows, spot-market water purchases, beneficial rainfall, and the groundwater basin-safe yield also contribute to the Rosedale water supply portfolio (Rosedale 2019).

As shown in **Table 5-1**, for the period from 1995 through 2019, Rosedale's average annual water supply was 106,400 AF and the average annual demand was 99,400 AF (Rosedale 2020). Rosedale's water demand is primarily from crop use. Average urban use has doubled since 1990 but still only accounts for approximately 8 percent of Rosedale's water demand. To meet the demand, approximately half of Rosedale's water portfolio is from surface water supplies (either contracted supplies or water purchases). Rosedale's projected future demand through 2070 may fluctuate based on a number of factors. Changes in demand could result in an increase over time due to climate change affecting evapotranspiration, decrease due to conversion of agricultural lands to urban use, and decrease due to reduced water sale commitments (Rosedale 2019). Rosedale's projected future water demand is 98,013 AFY (Rosedale 2019). Rosedale's forecasted water supply balance is based on sustainable yield, which is the sum of native yield, precipitation, and project water. The supply through 2070 is expected to be 84,366 AFY, resulting in a deficiency of approximately 13,647 AFY (Rosedale 2019).

TABLE 5-1
ROSEDALE'S SUPPLY AND DEMAND, 1995 TO 2019 (AVERAGE AF)

Source	Period from 1995 to 2019
Water Supply	
Surface Water	50,800
Purchased Groundwater	6,400
Groundwater Recharge Program – District Share	14,800
Flood Flows	3,400
Natural Inflow (Precipitation and Safe Yield)	31,000
Water Demand	
Crop Consumptive Use	84,600
Urban Use	8,100
Water Transfers	3,300
Assessed Banking Program Loses	3,400
Total Supply	**106,400**
Total Demand	**99,400**

SOURCE: Rosedale 2020

5.3.2 IRWD

IRWD is a member agency of the Municipal Water District of Orange County (MWDOC), which is a wholesale importer of water from the Metropolitan Water District of Southern California (MWD). MWD manages and coordinates the delivery of imported surface water supplies from the Colorado River and from Northern California through the SWP with six southern California counties including Orange County. MWDOC, as a water wholesale agency, does not provide water directly to customers but rather purchases it from MWD and sells it to its approximately 30 member agencies, comprising cities and water districts throughout the county. These member agencies, including IRWD, are the local water retailers, selling water directly to their local customers. IRWD is the largest retail member agency of MWDOC in terms of service area and overall water use.

IRWD's water supplies include imported potable and non-potable water, groundwater, surface water, and recycled water. IRWD also has existing banked water for use during times when other exchanges. Approximately 50 percent of IRWD's overall supply comes from local groundwater wells in the Orange County Groundwater Basin, and the Irvine and Lake Forest sub-basins. IRWD also receives a small amount surface water from other local sources including the Santiago Creek watershed. Water supply and demand projections for the service area are provided in **Table 5-2**. As shown in Table 5-2, potable water demand is projected to steadily increase from 2020 to 2035 by about 15 percent.

TABLE 5-2
IRWD CURRENT AND PROJECTED WATER SUPPLY AND DEMAND (AFY)

Source	2015	2020	2025	2030	2035
Water Demand					
Potable and Raw Water Demand	64,154	71,086	77,700	80,645	81,966
Recycled Water Demand	26,249	25,359	28,261	28,786	29,311
Water Supply					
Imported Water (Potable)	12,790	41,929	41,929	41,929	41,929
Imported Water (Non-Potable)	5,906	17,826	17,826	17,826	17,826
Surface Water	2,826	N/A	N/A	N/A	N/A
Groundwater	46,770	53,171	65,523	65,523	65,523
Groundwater (Non-Potable)	4,063	3,514	3,514	3,514	3,514
Recycled Water	22,866	28,757	28,757	28,757	28,757
Total Demand	**90,403**	**96,445**	**105,961**	**109,431**	**111,277**
Total Supply	**95,220**	**145,197**	**157,549**	**157,549**	**157,549**

SOURCE: IRWD 2016

IRWD's UWMP identifies and evaluates available supplies to meet demands under multiple dry-year scenarios. If MWD imported supplies are reduced through its implementation of a Water Supply Allocation Plan, IRWD would implement measures in its Water Shortage Contingency Plan. One source of supplemental supply during a MWD shortage is IRWD's stored water within its Water Banks. Generally, during periods of drought, should MWD's sources be stressed through multiple dry years, or suffer catastrophic failure (e.g., from a Delta levee failure that interrupts SWP deliveries), IRWD could augment reduced imported MWD water supplies through recoveries and deliveries from its Water Banks or increased local groundwater pumping on a short-term basis. Under any shortage scenarios, IRWD would initially implement increased conservation measures as described in IRWD's UWMP and Water Shortage Contingency Plan. The proposed project would help to further augment IRWD's dry-year supply portfolio to enhance water supply reliability and redundancy. Redundant water sources also enhance the system's overall reliability for potential scenarios such as catastrophic failures of water conveyance infrastructure. To plan for these contingencies, a diverse water supply portfolio provides the highest degree of reliability.

5.4 Growth Inducement Potential

The proposed project would provide additional groundwater recharge, storage and recovery capacity in the Kern Fan region to augment Rosedale's existing and future conjunctive use programs and enhance water supply reliability for Rosedale and IRWD during periods when other supplies are reduced or interrupted. The proposed project would not have a direct growth-inducing effect within the IRWD service area or the Rosedale district boundaries. Implementation of the proposed project would not have a direct growth inducement effect because it does not propose to support development of new housing, business, or industrial that

would attract additional population to the area. Further, implementation of the proposed project would not result in substantial permanent employment that could indirectly induce population growth. Although construction activities would create some short-term construction employment opportunities over the approximately 5-year duration of construction, the amount of opportunities created would not require persons outside of the Kern County workforce. Further, up to 3 to 5 new permanent employees would be required to operate the proposed recharge, recovery, and Kern Fan Conveyance Facilities. These new Rosedale employees also are anticipated to come from the existing County workforce.

The proposed project provides water supply reliability to Rosedale and IRWD through redundancy and diversification of water supply options available in future years. For Rosedale, the proposed project would allow storage of surplus water that could help alleviate water supply shortfalls and work to achieve groundwater sustainability within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin.

IRWD has more than adequate water supplies (existing and under development) to meet projected demands to the year 2035 (see Table 5-2). This proposed project provides a means of augmenting supplies during periods when existing sources may be temporarily reduced or interrupted and provides a cost effective means of managing contingency and drought planning needs. The proposed project would not be capable of providing water every year and therefore could not support the continuous demands associated with population growth within IRWD's service area.

Neither IRWD nor Rosedale has authority or responsibility for approving land use designations. Neither district makes decisions about approving new development that would require connections to potable water supplies. Planning in the IRWD service area is the responsibility of all municipalities within IRWD's service area. Cities within the IRWD service area include the cities of Irvine, Tustin, Orange, Newport Beach, Lake Forest, and Costa Mesa. Some unincorporated areas of the County of Orange are also within IRWD's service area boundary. Rosedale encompasses unincorporated Kern County and the City of Bakersfield sphere of influence that dominate the growth projections. The cities and the counties are responsible for identifying and accommodating growth within their boundaries. Each city and county has prepared a General Plan that identifies growth projections specific to their areas. Each of the cities and counties acknowledge that population is increasing and each entity has identified significant impacts associated with the growth. Each entity has evaluated the environmental effects of growth authorized by their existing, adopted general plans and if necessary has adopted overriding considerations pursuant to CEQA requirements, acknowledging that growth results in secondary impacts that may be significant and unavoidable. These impacts include increased air pollution, traffic congestion, and loss of open space and farmland. As a result, the water supply reliability improvements associated with the proposed project would support existing development and planned growth envisioned by the land use agencies with authority to approve such decisions. Land use planning, which creates water demand in a conceptual sense, must precede water planning to meet that demand (*County of. Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 950-951.), which ensures land use agencies consider environmental effects of authorizing growth at general plan level before water suppliers develop the supplies needed to serve that growth.

Water banking provides for effective groundwater management within the Rosedale service area that benefits overlying groundwater users and banking entities. Water banking does not promote or induce growth within the Rosedale service area. This analysis does not evaluate growth inducing impacts of any third parties that may contract with Rosedale for eventual use in the project. That would require additional environmental analysis. Use of property for recharge basins prevents other development on the site and is compatible with existing agricultural land uses in the area.

The proposed project neither supports nor encourages growth within the IRWD or Rosedale service areas to a greater degree than presently estimated by the agencies with land use jurisdiction within their service areas. The proposed project would not remove any obstacles to growth and would not indirectly have a significant impact on growth inducement.

5.5 References

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CHAPTER 6
Alternatives Analysis

6.1 Overview of Alternatives Analysis

According to CEQA, an EIR must describe a reasonable range of alternatives to a proposed project that would feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the proposed project's significant environmental effects. Section 15126.6(f) of the CEQA Guidelines provides direction on the required alternatives analysis:

> *The range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision making.*

The alternatives considered may include a different type of project, modification of the project, or suitable alternative project sites. An EIR need not consider every conceivable alternative to a project. Rather, the alternatives must be limited to ones that meet the project objectives, are feasible, and would avoid or substantially lessen at least one of the significant environmental effects of the project. "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (CEQA California Public Resources Code Section 21061.1). Section 15126.6(b) of the CEQA Guidelines states an EIR:

> *…must identify ways to mitigate or avoid the significant effects that a project may have on the environment, the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.*

Section 15126.6(d) of the CEQA Guidelines provides further guidance on the extent of the alternatives analysis required:

> *The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. If an alternative*

> *would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed.*

The EIR must briefly describe the rationale for selection and rejection of alternatives and the information the lead agency relied on when making the selection. It also should identify any alternatives considered but rejected as infeasible by the lead agency during the scoping process and briefly explain the reasons for the exclusion. Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the project objectives, are infeasible, or do not avoid any significant environmental effects.

Section 15126.6(e) (1) of the CEQA Guidelines also requires that the No Project Alternative must be addressed in this analysis. The purpose of evaluating the No Project Alternative is to allow decision-makers to compare the potential consequences of the proposed project with the consequences that would occur without implementation of the proposed project.

Finally, an EIR must identify the environmentally superior alternative. The No Project Alternative may be the environmentally superior alternative to the proposed project based on the minimization or avoidance of physical environmental impacts. CEQA Guidelines (Section 15126.6(e)(2)) requires that, if the environmentally superior alternative is the No Project Alternative, the EIR shall identify an environmentally superior alternative among the other alternatives.

6.1.1 Project Objectives

The objectives of the proposed project are as follows:

- Capture, recharge and store water from the SWP and CVP and other available water supplies for later use.
- Provide ecosystem public benefits, emergency water supply public benefits during extended droughts or a Delta levee failure, and water supply benefits for agricultural, M&I and federal wildlife refuge uses.
- Provide operating flexibility for Rosedale's existing and future conjunctive use programs.
- Assist in achieving groundwater sustainability within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin through implementation of projects consistent with California Executive Order N-10-19 directing state agencies to develop a "water resilience portfolio."
- Provide Rosedale and IRWD customers and existing partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted.

6.1.2 Potentially Significant Impacts of the Proposed Project

Chapter 3 of this Draft EIR identifies potential impacts associated with the proposed project for each environmental issue area in Appendix G of the *CEQA Guidelines*, including cumulative impacts. Chapter 4 addresses CEQA-Plus requirements that are required due to a federal funding nexus. Chapter 5 addresses impacts anticipated related to growth-inducement. Mitigation measures were identified to reduce all of the potentially significant impacts to a less than significant level. No significant and unavoidable impacts were identified as a result of construction and operation of the proposed project. A summary of the significance of the greatest impacts for each environmental resource analyzed in Chapter 3 is presented in **Table 6-1**. Specific impacts and all mitigation measures are provided in Table ES-1 in the Executive Summary of this Draft EIR.

TABLE 6-1
SUMMARY OF PROPOSED PROJECT IMPACT ANALYSIS

Environmental Resource	Proposed Project Significance Determination
Aesthetics	LTSM
Agriculture and Forestry Resources	LTSM
Air Quality	LTSM
Biological Resources	LTSM
Cultural Resources	LTSM
Energy	LTS
Geology and Soils	LTSM
Greenhouse Gas Emissions	LTS
Hazards and Hazardous Materials	LTSM
Hydrology and Water Quality	LTSM
Land Use and Planning	LTSM
Mineral Resources	LTS
Noise and Vibration	LTSM
Transportation	LTSM
Tribal Cultural Resources	NI
Utilities and Service Systems	LTS
Wildfire	LTSM

Notes:
NI = No Impact
LTS = Less than Significant
LTSM = Less than Significant with Mitigation

6.2 Development of Project Alternatives

As part of the planning process for the proposed project, IRWD and Rosedale prepared an in-depth evaluation and comparison of alternatives for the project within the *Kern Fan Groundwater Storage Project Feasibility Report* (2020). This section briefly describes three alternative alignments considered for the Kern Fan Conveyance Facilities and an alternative to the project involving participation in another water bank, the Willow Springs Water Bank Conjunctive Use Project (IRWD and Rosedale, 2020).

As part of the Project Feasibility Report, in addition to analyzing the feasibility of the alternatives and the ability to meet the project objectives, the Authority discussed the consistency of the alternatives with other water management programs and regulations. When evaluating and comparing the alternatives, several screening criteria were used, which include preliminary cost estimates as well as ability to provide the following benefits (IRWD and Rosedale, 2020):

- Municipal and Industrial (M&I) Water Supply Benefits
- Groundwater Benefits
- Agricultural Water Supply Benefits
- Incremental Water Supply for federal wildlife refuges
- Ecosystem Enhancement Benefits
  - Fish Species Recovery
  - Intermittent Wetland Habitat
- Emergency Response Benefits
  - Extended Drought
  - Delta Failure
- Agricultural Impact Benefits

6.2.1 Kern Fan Conveyance Facilities Alternative Alignments

The proposed project would include the construction of new conveyance, recharge, and recovery facilities. Three different conveyance alignments were evaluated for the proposed project: the Kern Water Bank Alignment Alternative; the Buena Vista Alignment Alternative, and the Eastside Canal Alignment Alternative. These three alignment alternatives are briefly identified below and shown in **Figure 6-1**. All three alignment alternatives are located within the proposed "Kern Fan Conveyance Facilities Area" illustrated on Figure 2-1 within Chapter 2, *Project Description* of this Draft EIR. The general configuration of the groundwater recharge and recovery facilities would remain the same regardless of the conveyance alignment that is ultimately selected (IRWD and Rosedale 2020). And, the final conveyance alignment would be determined once the location for the proposed recharge and recovery facilities is identified. However, these three alternative alignments were considered for planning purposes as feasible design opportunities for the conveyance options of the proposed project, and were used to define the Kern Fan Conveyance Facilities Area that is evaluated in this Draft EIR for the potential location of conveyance facilities.

Kern Water Bank Alignment Alternative

The Kern Water Bank (KWB) Alignment Alternative features an approximately 7.6-mile long conveyance canal alignment from the California Aqueduct to the proposed project recharge facilities across the Authority's property (refer to **Figure 6-1**). The use of an open canal for the entire length of the conveyance facility would result in the need for two lift stations to be constructed. Each lift station would have a capacity of 500 cubic-feet per second (cfs). The Aqueduct turnout would be a reinforced concrete structure with a single 11-foot diameter pipe from the turnout structure discharging into an open canal. The turnout would be located in Pool 28 or Reach 12E of the California Aqueduct just north of the existing Kern County Water Agency

– Cross Valley Canal Turnout located at Milepost 238.04 and Check No. 28. The conveyance canal cross section has been estimated as 20-ft wide at the bottom with an 9-ft depth with 1.5:1 side slopes in the lined portions and 3:1 side slopes in the unlined portions. The canal would have an undercrossing at the KWB Main Canal and would utilize one 10-foot diameter siphon pipe. A 500 cfs lift station would be constructed near the Interstate (I) 5 freeway crossing. The crossing at the I-5 freeway would consist of one 10-ft diameter pipeline, which discharges into an open canal on the easterly side of the I-5 Freeway north of the KWB Pioneer Canal. The canal will have a siphon crossing at Stockdale Highway using one 10-foot- diameter siphon pipe. The second lift station of similar size and capacity to the first lift station would be constructed near the southwest corner of the Rosedale West Basins. The final canal reach will deliver water to the east end of the Rosedale West Basins, the Goose Lake Channel, and the Phase 2 spreading basins (IRWD and Rosedale 2020).

Buena Vista Alignment Alternative

The Buena Vista (BV) Alignment Alternative for the proposed project differs from the KWB Alignment Alternative only in terms of the new conveyance constructed as part of the project. Both the recharge and recovery facilities are expected to be materially the same. In addition, the overall operation of the project is expected to be similar regardless of the alignment that is ultimately selected (IRWD and Rosedale 2020).

The BV Alignment Alternative involves constructing a 9-mile conveyance canal across Buena Vista Water Storage District property (refer to Figure 6-1). The use of an open canal for the entire length of the conveyance facility will result in the need for constructing three lift stations. Each lift station would have a capacity of 500 cfs. A turnout from the California Aqueduct would be constructed with one 11-foot diameter pipe from the turnout structure, crossing the DWR right-of-way and outlet canal, and then discharging into an open canal parallel to the BV West Side Canal. The turnout would be located in Pool 28 or Reach 12E of the California Aqueduct just south of the existing Buena Vista – 8 Turnout located near Milepost 233.78. The new lined canal cross section has been estimated as 20-ft wide at the bottom with an 8-ft depth and 1.5:1 side slopes. The canal would have an undercrossing at Adohr Road and the East Side Canal and will utilize one 10-foot diameter siphon pipe. A 500 cfs lift station would be constructed near the Stockdale Highway Crossing. The pipeline crossing Stockdale Highway is a 10-foot diameter pipeline, which discharges into an open canal on the northerly side of Stockdale Highway and then proceeds north and east towards the I-5 Freeway crossing. A 500 cfs lift station would be constructed near the I-5 Freeway crossing. The pipeline crossing the I-5 Freeway is a 10-foot diameter pipeline that discharges into the open canal on the easterly side of the I-5 Freeway. A third lift station of similar size and capacity to the first two lift stations will be constructed near the southwest corner of the Rosedale West Basins. The final canal reach delivers water to the east end of the Rosedale West Basins, Goose Lake Channel, and the Phase 2 spreading basins (IRWD and Rosedale 2020).

Eastside Canal Alignment Alternative

The East Side Canal (ESC) Alignment Alternative for the proposed project differs from the KWB and BV Alignment Alternatives only in terms of the new conveyance constructed as part of the project. Both the recharge and recovery facilities are expected to be materially the same. In addition, the overall operation of the project is expected to be similar regardless of the alignment that is ultimately selected (IRWD and Rosedale 2020).

The ESC Alignment Alternative for the project involves the use of a 9-mile open canal for the entire length, with three lift stations (refer to Figure 6-1). Similar to KWB and BV Alignment Alternatives, each lift station would have a capacity of 500 cfs. The ESC Alignment would make use of the existing West Side and East Side Canals. The turnout from the California Aqueduct is a reinforced concrete structure with one 11-foot diameter pipe extending from the structure, crossing the outlet canal, and then discharging into the West Side Canal. The turnout would be located in Pool 28 or Reach 12E of the California Aqueduct just north of the existing Buena Vista – 2 Turnout located near Milepost 235.75. The West Side Canal would be widened to the south approximately 30 feet and would then feed into the East Side Canal. The East Side Canal would be widened approximately 30 feet to the southwest of Station Road and then widened approximately 30 feet to the northeast of Station Road. A 500 cfs lift station would be constructed near the Stockdale Highway crossing. The crossing would consist of a 10-foot diameter pipeline that discharges into an open canal on the northerly side of Stockdale Highway, then proceed north and east towards the I-5 Freeway crossing. A 500 cfs lift station would be constructed near the I-5 Freeway crossing. The pipeline crossing the I-5 Freeway is a 10-foot diameter pipeline that discharges into an open canal on the easterly side of the I-5 Freeway. The third lift station of similar size and capacity to the first two lift stations would be constructed near the southwest corner of the Rosedale West Basins. The final canal reach delivers water to the east end of the Rosedale West Basins, the Goose Lake Channel, and the Phase 2 property (IRWD and Rosedale, 2020).

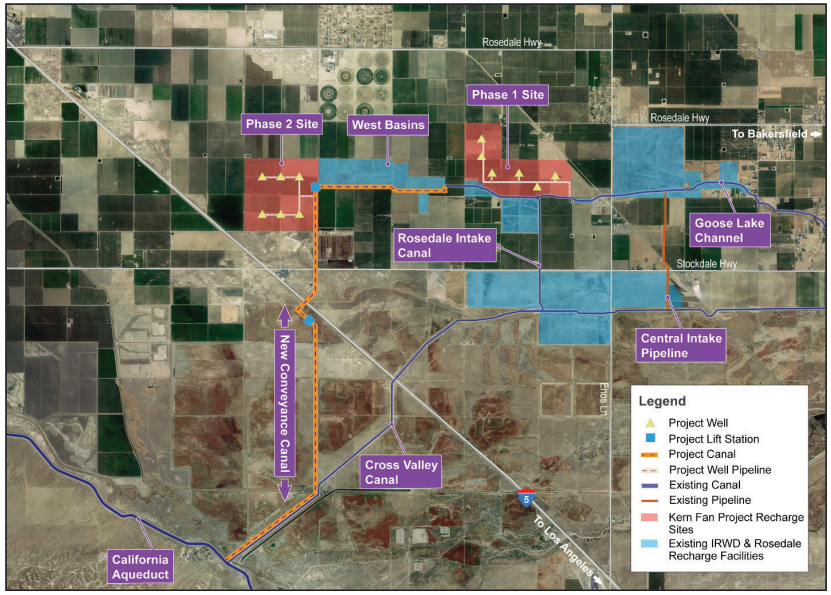
Comparison of Alignment Alternatives

Each alternative alignment was compared by analyzing how well the alternative would achieve the planning objectives of the proposed project. The following three planning criteria were compared for each alternative alignment:

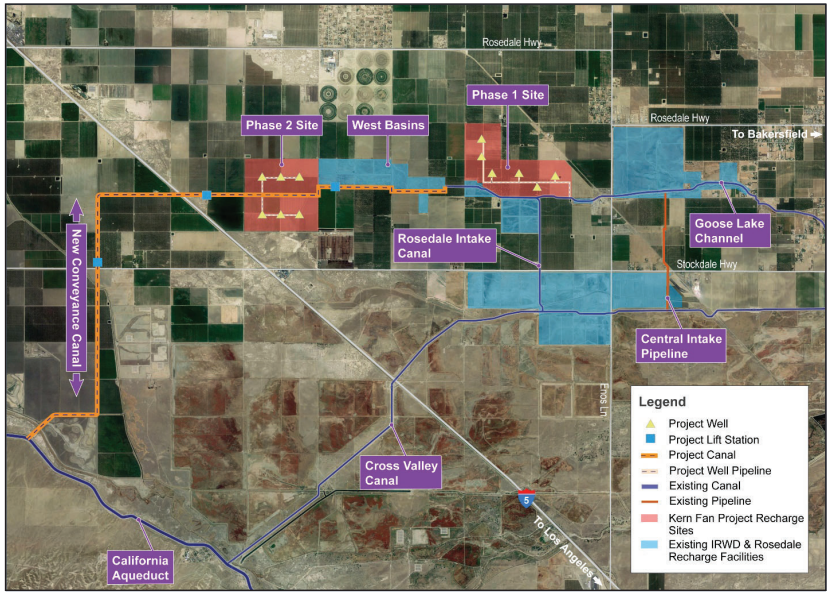
- Completeness: The performance measures compared in this planning criterion included an analysis of a full spectrum of objectives, reliability, and relative complexity associated with designing and constructing each alignment.

- Effectiveness: The performance measures compared in this planning criterion included and analysis of water supply reliability, improvement of habitat conditions of important species, and the contribution to more resilient and sustainably managed water infrastructure.

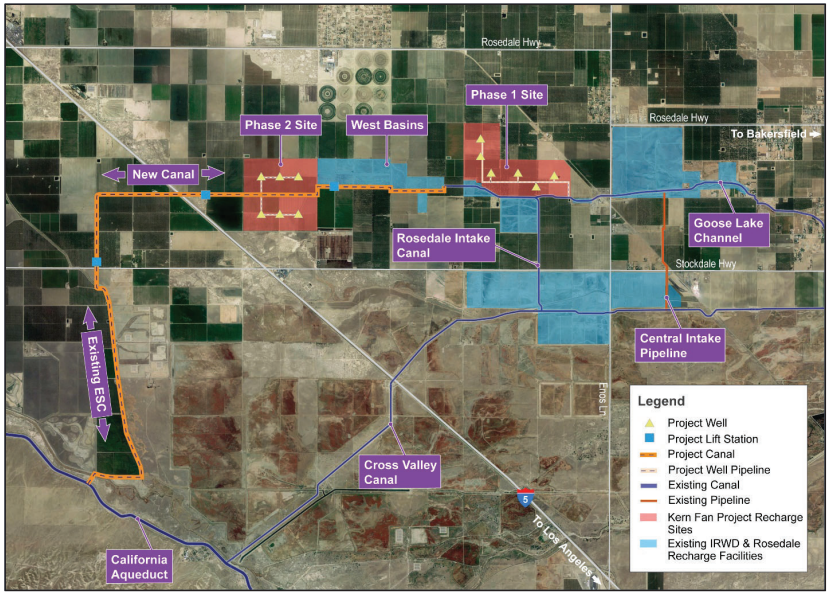
- Acceptability: The performance measures compared in the planning criterion included an analysis of biological resources impacts of construction, physical resources impacts of construction and social resources impacts.



Preliminary Location of Kern Fan Groundwater Storage Project Facilities with KWB Alignment



Preliminary Location of Kern Fan Groundwater Storage Project Facilities with BV Alignment



Preliminary Location of Kern Fan Groundwater Storage Project Facilities with ESC Alignment

D190252.00

SOURCE: Authority 2020

Kern Fan Groundwater Storage Project

Figure 6-1
Kern Fan Conveyance Facilities Alternative Alignments

ESA

The planning criteria were provided a color rating for the purposes of quantifying which alternative alignment would be recommended. The BV Alignment had the best relative combination of completeness, effectiveness, and acceptability and is the recommended alternative alignment because this alignment would have the least amount of impacts to biological and physical resources during project construction. Although the BV alignment was the preferred alternative, this alignment cannot be finalized until the Authority identifies the location of the proposed recharge/recovery facilities. Ultimately, the final conveyance alignment would be located within the Kern Fan Conveyance Facilities Area shown on Figure 2-2 of Chapter 2, *Project Description*, thus the environmental impacts are assessed in this Draft EIR.

6.2.2 Water Bank Alternative

The Water Bank Alternative would involve participation in the Willow Springs Water Bank (WSWB). WSWB is an existing facility located in the Antelope Valley in Southern California capable of storing 1,000,000 acre-feet AF of water underground. The WSWB is situated on highly permeable soils near three major water conveyance facilities (East Branch of the California Aqueduct, the Antelope Valley-East Kern (AVEK) West Feeder, and the Los Angeles Aqueduct) and offers water storage opportunities to both upstream and downstream water agencies (IRWD and Rosedale, 2020).

This alternative was analyzed using the same screening criteria as described above under *Comparison of Alignment Alternatives*. The Water Bank Alternative was selected for a detailed analysis, along with the No Project Alternative (see Section 6.4, *Alternatives to the Proposed Project*, below).

6.3 Alternatives Considered and Rejected

This section identifies other project alternatives that were considered but rejected from further consideration.

Recharge Basin Location Alternative

CEQA Guidelines Section 15126.6(f)(2) provides guidance regarding consideration of one or more alternative location(s) for a proposed project, stating that putting the project in another location should be considered if doing so would allow significant effects of the project to be avoided or substantially lessened. As part of the proposed project, the Authority is considering alternative locations for the proposed recharge and recovery facilities in the designated Phase 1 and Phase 2 areas. The alternative alignment locations the Authority has considered for the Kern Fan Conveyance Facilities are described above in Section 6.2.1. The locations of the Phase 1 and Phase 2 areas were evaluated and delineated based on a list of criteria that define the ideal conditions for implementation of the proposed project. The criteria included the following:

- Properties are available for purchase and at an economically-feasible price;
- Development costs are reasonable and economically feasible;
- Soil permeability conditions and infiltration rates are adequate for groundwater recharge;

- There is an unconfined aquifer below the properties (i.e. no clay layers that could impede long term recharge and storage);
- There is adequate storage space in the aquifer below the properties;
- Groundwater quality is compatible with pump-in requirements of the California aqueduct;
- Existing conveyance facilities are proximate to the properties; and
- Other environmental constraints such as soil quality and existing land use are compatible with a groundwater banking project.

Based on these criteria, the Phase 1 and Phase 2 areas were selected for the proposed project. Implementing recharge and recovery facilities in other areas in and around the Rosedale service area would either be infeasible due to costs or the lack of available properties for purchase, or would result in greater environmental impacts due to construction and operation of facilities that are further from regional conveyances such as the CVC or California Aqueduct. If facilities are further from regional conveyances, the proposed Kern Fan Conveyance Facilities would be longer, resulting in greater amounts of ground disturbance, and would require more energy to move water to/from the proposed recharge and recovery facilities. The impacts associated with implementing the proposed recharge and recovery facilities in the proposed Phase 1 and Phase 2 areas are described throughout this Draft EIR and would meet the project objectives.

Injection Well Alternative

Under the Injection Well Alternative, the Authority would construct injection wells within the Phase 1 and 2 areas to inject water into the groundwater basin rather than construct recharge basins on the surface. This proposed alternative would include construction of large water storage facilities onsite to hold water for injection. The other components of the project, including conveyance and extraction facilities, would be similar to the proposed project. The Injection Well Alternative would be cost prohibitive. In addition, the aquifer characteristics make injection at this level not practical. Due to cost limitations and operational impracticalities, this alternative was rejected from further analysis.

Orange County Storage

Water storage facilities could be constructed in Orange County to provide water supply reliability during dry years for IRWD. IRWD could develop an in-county storage program either by (a) partnering with Orange County Water District (OCWD) to develop a banking program to store water in the Orange County Groundwater Basin or (b) constructing surface storage facilities.

OCWD is not partnering with individual retail water agencies to develop groundwater banking programs at this time. Therefore, a groundwater banking program within Orange County is not feasible.

IRWD could construct surface storage facilities within its service area, such as reservoirs and tanks, to store water during wet years for use during dry years and multiple-drought years. Implementing an in-county surface storage program would require IRWD to purchase a substantial amount of land that could accommodate enough storage reservoirs and tanks with a

combined maximum capacity of at least 37,500 AF. An average storage tank holds 8-million-gallons or approximately 25 AF and is approximately 135 feet in diameter. If the groundwater storage were to be converted to aboveground storage tanks, approximately 1,500 8-million-gallon storage tanks would be need to be constructed within IRWD's service area. This scale of facility construction and operation would be infeasible for IRWD to implement given open space constraints in the service area. Additionally, constructing 1,500 storage tanks would not be economically feasible for IRWD. As a result, replacement of groundwater storage with aboveground storage tanks is not considered to be a feasible project alternative and is rejected from further consideration in this Draft EIR.

Conservation

In 2016, Governor Brown issued an Executive Order calling for Californians to build on the actions taken during the recent statewide drought, and to "Make Conservation a Way of Life in California."." In response, legislation requiring statewide long-term water use efficiency passed in 2018. As a result, the state will establish new long-term water efficiency objectives by June 30, 2022. IRWD has a long history of implementing cost-effective water efficiency programs, and it is well prepared to meet the future efficiency standards.

In December 2019, the District completed a Future Potential Water Efficiency Study which provided a comprehensive evaluation of IRWD's water use efficiency programs. The Study found that the water efficiency programs implemented by IRWD have been very successful, with over 150,000 devices and over 100 acres of turf replaced by IRWD customers through participation in the wide variety of water efficiency programs offered over the last ten years. Participation in these water efficiency programs coupled with natural replacement with newer more efficient devices has resulted in measurable water savings and a substantial reduction in water use. IRWD's average residential gallons per capita per day (gpcd) is one of the lowest in the state. IRWD's average fiscal year 2019-20 residential gpcd was 69, compared with a statewide average of 88 gpcd.

IRWD always has basic measures that are always in effect in its service area: inform the public consciousness in order to help reduce water demand; prevention of irrigation run-off and water waste; leak prevention; and prohibitions on water waste. This is supplemented with targeted outreach and programs to different customer sectors. In addition, IRWD has a budget-based rate structure that is based on the cost of service, which also limits the amount of water allocated to each customer to an amount that is reasonable for the customer's needs and property characteristics, reducing wasteful use of water (IRWD 2018). IRWD continues to promote new ways to conserve water and enhance urban water use efficiency, both locally and statewide, and continues to engage productively in statewide policy discussions on how to enhance urban water use efficiency while improving statewide and local drought resiliency (IRWD 2018).

Under extreme shortage scenarios, IRWD can temporarily implement further demand reduction efforts as described in IRWD's Water Shortage Contingency Plan (2018). Conservation efforts combined with supplemental supplies provided by the proposed project to augment IRWD's supply portfolio provide the most effective and reliable water supply alternative. Therefore, conservation by itself was not considered feasible to achieve the project objectives.

Recycled Water

Water recycling and reuse is a form of water conservation. In 1967, IRWD began using recycled water to supplement its potable water supply portfolio. In half a century, IRWD has created one of the most comprehensive and technologically advanced water recycling systems in the nation (IRWD 2020). Approximately 26 percent of IRWD's water demands are met through recycled water. In recent years, IRWD and its customers have reduced the use of outdoor irrigation by approximately 50 percent. However, the long-term reduction in recycled water use can undervalue IRWD's water use efficiency programs and undercut potable water savings. IRWD treats the amount of water that flows through its recycled water treatment plants. Additional recycled water use expansion could not be implemented as an alternative to the proposed project because IRWD already extensively serves recycled water to meet non-potable demands which has reduced potable water use. When imported water supplies may be cutback due to drought or interrupted, IRWD cannot use recycled water to meet potable water demands and therefore would need to augment potable water supply. Therefore, recycled water was not considered as a feasible project alternative.

6.4 Alternatives to the Proposed Project

Two alternatives were selected for detailed analysis. As stated previously on page 6-1, according to CEQA, an EIR must describe a reasonable range of alternatives to a proposed project that would feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the proposed project's significant environmental effects. As concluded in Chapter 3 of this Draft EIR, the proposed project would not result in any Significant and Unavoidable impacts. Nonetheless, this alternatives analysis has been prepared to evaluate other alternatives to compare with the proposed project.

The following sections provide a general description of each identified alternative, its ability to meet the project objectives, and a discussion of its comparative environmental impacts. As provided in Section 15126.6(d) of the *CEQA Guidelines*, the significant effects of these alternatives are identified in less detail than the analysis of the project in Chapter 3 of this Draft EIR.

6.4.1 No Project Alternative

According to Section 15126.6(e) of the *CEQA Guidelines*, discussion of the No Project Alternative must include a description of existing conditions and reasonably-foreseeable future conditions that would exist if the project were not approved. Under the No Project Alternative, the Authority would not construct or operate any proposed recharge, storage, recovery or conveyance facilities in the project area.

Ability to Meet Project Objectives

The No Project Alternative would not meet most of the project objectives. Without the proposed project, Rosedale and IRWD would continue to capture, recharge, and store water from the SWP, CVP, and other available water supplies for later use through existing projects and facilities within Rosedale's Conjunctive Use Program. Under the No Project Alternative, greater operating

flexibility would not be provided for existing and future conjunctive use programs. In addition, under the No Project Alternative, the benefits of the proposed project, which includes ecosystem public benefits, emergency water supply public benefits during extended droughts or a Delta levee failure, and water supply reliability benefits to agricultural and M&I users would not occur. Additionally, under the No Project Alternative, the benefit of the proposed project to provide operational flexibility to the CVP and Incremental Level 4 supplies to federal wildlife refuges would not occur. Finally, under the No Project Alternative, the benefit to groundwater sustainability in the Kern County Sub-basin would not occur.

Impact Analysis

Aesthetics

The construction and operation of recharge, recovery, storage and conveyance facilities would not occur under the No Project Alternative. The No Project Alternative would have no potential to impact scenic vistas, scenic resources, visual character, or light and glare in the proposed project area since no new facilities would be built. The proposed project would have a less than significant impact to scenic vistas and visual character after implementation of mitigation measures that require nighttime construction lighting and security lighting installed on new facilities to be shielded downward and away from neighboring properties. Since the No Project Alternative would not alter any above-ground or below-ground facilities within the project area, it would result in fewer aesthetic impacts when compared to the proposed project.

Agriculture and Forestry Resources

The construction and operation of recharge, recovery, storage and conveyance facilities would not occur under the No Project Alternative. The No Project Alternative would have no potential to: convert FMMP-designated Farmland and/or high quality soils to non-agricultural use; or conflict with zoning for agricultural use or a Williamson Act Contract. The proposed project would have a less than significant impact to agricultural resources after implementation of a mitigation measure to ensure consistency with Williamson Act Contracts due to implementation of the proposed facilities. The proposed project also would directly benefit farmland in the project area by conveying and storing water in the Kern County Sub-basin that would later be extracted to provide water for irrigation of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. The proposed project would have no impact to forestry resources. Since the No Project Alternative would not place proposed facilities within any agricultural land within the project area, it would result in fewer impacts to agricultural uses when compared to the proposed project. Although the No Project Alternative would forgo any benefits to farmland that would otherwise occur due to supporting sustainable groundwater resources as an irrigation water supply

Air Quality

The No Project Alternative would not involve any construction activities or operation of proposed recharge, recovery, storage and conveyance facilities and would therefore not generate emissions above baseline conditions that could impact air quality. During construction, the proposed project could result in potentially significant cumulative net increases of criteria pollutants within the project area and expose sensitive receptors to pollutant concentrations; however, mitigation measures would reduce the impacts to less than significant levels. As such, the No Project

Alternative would result in fewer air quality impacts when compared to the proposed project because no new air emission would occur relative to existing conditions.

Biological Resources

The No Project Alternative would not involve any construction activities or operation of proposed recharge, recovery, storage and conveyance facilities and would therefore not alter the existing site conditions within the project area. The proposed project has the potential to impact special status species such as, the Blunt-Nosed Leopard Lizard, San Joaquin Kit Fox, and San Joaquin Kangaroo Rat, and/or sensitive natural communities, which would be reduced to less than significance levels with implementation of mitigation measures. Additionally, the proposed project would result in less than significant impacts regarding confliction with local biological resources policies and ordinances and MBHCP and Kern Water Bank HCP/NCCP with the implementation of mitigation measures.

The No Project Alternative would completely avoid potential impacts to sensitive special-status species, sensitive natural communities, wetlands, local policies and ordinances, the MBHCP and Kern Water Bank HCP/NCCP, and cumulative impacts to biological resources. Therefore, the No Project Alternative would result in fewer potential biological resource impacts than the proposed project. However, the proposed project would benefit fishery ecosystems in the Delta, waterfowl and migratory birds, and wetland habitats when the project is operated during recharge events, as well as provide incremental water for federal wildlife refuges. Therefore, the No Project Alternative would not achieve beneficial affects to those biological resources within the project area without project implementation.

Cultural Resources

The No Project Alternative would not involve any construction activities or operation of proposed recharge, recovery, storage and conveyance facilities and therefore would not result in ground disturbance that would disrupt or affect archaeological resources, historic resources, or human remains. Although the proposed project would not directly impact any known cultural resources, construction activities would involve grading and excavation that could significantly impact unknown discovered cultural resources. With implementation of mitigation measures, the proposed project would result in less than significant impacts to unknown resources. Nevertheless, the No Project Alternative would result in no ground disturbance and therefore no potential to uncover any cultural resources. As a result, the No Project Alternative would result in fewer impacts to cultural resources than the proposed project.

Energy

The No Project Alternative would not involve any construction activities or operation of proposed facilities, and would therefore not result in an increase in energy consumption relative to existing conditions. The proposed project would result in an increased usage of energy during construction and intermittent increases of energy usage during operational activities, but not at significant levels that would result in wasteful use of energy. The proposed project would result in less than significant impacts in regards to conflicts with state or local renewable energy or energy

efficiency plans. Nonetheless, the No Project Alternative would result in lesser impacts to energy consumption when compared to the proposed project.

Geology and Soils

The No Project Alternative would not involve any construction activities or operation of proposed recharge, recovery, storage and conveyance facilities. As a result, the No Project Alternative would not result in ground disturbance that would disrupt or affect unique paleontological resources or unique geologic features. With implementation of mitigation measures, the proposed project would result in less than significant impacts to paleontological resources. As a result, since the No Project Alternative would not result in any ground disturbing activities or potential to uncover paleontological resources, the alternative would result in fewer geological, soil, and paleontological impacts when compared to the proposed project.

Greenhouse Gas Emissions

The No Project Alternative would not involve any construction activities or operations of proposed recharge, recovery, storage and conveyance facilities and therefore would not result in an increase in greenhouse gas emissions relative to existing conditions because no infrastructure would be constructed. The proposed project would result in greenhouse gas emissions during construction but not at significant levels. As such, the No Project Alternative would result in fewer greenhouse gas emissions impacts when compared to the proposed project.

Hazards and Hazardous Materials

The No Project Alternative would not involve any construction activities or operations of proposed facilities. As a result, no impacts regarding hazards and hazardous materials would occur. While the proposed project could create a hazard to the public or environment through routine transport, use, disposal, or accidental release of hazardous materials, mitigation measures would implement soil sampling and Phase I Environmental Site Assessments (ESA) to reduce potential impacts to less than significant levels. Implementation of those same mitigation measures would reduce potential impacts to the public or environment due to being located on hazardous material sites to less than significant levels. Similarly, mitigation measures involving haul route coordination would reduce potential impacts of emitting hazardous materials within one-quarter mile of an existing school to less than significant levels. Additionally, implementation of the Traffic Control Plan would reduce potential impacts involving the impairment or physically interference with adopted emergency response and evacuation plans.

The No Project Alternative would not involve the transport or use of hazardous materials within the project area, introduce construction personnel or structures to hazardous sites, or impair/ interfere with emergency plans or routes. As a result, the No Project Alternative would result in fewer impacts to hazards and hazardous materials when compared to the proposed project.

Hydrology and Water Quality

The No Project Alternative would not result in construction or operation of any new facilities within the project area, and therefore would not result in ground disturbance that could violate water quality standards or waste discharge requirements, impact surface water, or degrade

groundwater quality. Under the proposed project, construction of new facilities would involve ground-disturbing activities that could impact surface water and groundwater quality due to polluted runoff from the soil stockpiling and construction sites. Such potential impacts would be mitigated with implementation of soil sampling and removal of contaminated soils from the project area. The No Project Alternative would not involve any ground-disturbing activities and would not have the potential for impacts to water quality during construction.

The No Project Alternative would not result in operation of any new recharge or recovery facilities, and therefore would have no affect to groundwater replenishment or groundwater levels. Operation of the proposed project has the potential to result in temporary groundwater mounding during recharge events and temporary groundwater drawdown during recovery events. However, the proposed project would not result in changes to groundwater levels that would adversely affect infrastructure at the surface due to shallow groundwater or adversely interfere with operation of neighboring wells due to groundwater pumping. Implementation of the proposed project provides beneficial impacts related to increasing groundwater supplies, recharge, and sustainable management of the basin. The project also provides a water supply for environmental, agricultural and M&I uses, which would not be available under the No Project Alternative. Under the No Project Alternative, the project area would not receive these beneficial impacts, and therefore, would result in greater impacts to hydrology and water quality when compared to the proposed project.

Land Use and Planning

The No Project Alternative would not result in construction or operation of any new facilities within the project area, and therefore would have no potential to interfere or conflict with existing land uses within the project area. Under the proposed project, implementation of new project facilities could conflict with a State or County land use plan, policy or regulation. However, implementation of mitigation measures to ensure consistency with Williamson Act Contracts and to protect and preserve biological resources would reduce potential impacts to less than significant levels. In addition, the proposed project would be consistent with SGMA by supporting sustainable groundwater management. The No Project Alternative would not involve implementation of recovery, recharge, storage and conveyance facilities within the project area. As a result, the No Project Alternative would result in fewer impacts to land use and planning when compared to the proposed project.

Mineral Resources

The No Project Alternative would not result in construction or operation of any new facilities within the project area, and therefore would not result in the loss of availability of known mineral resources within the project area. Under the proposed project, implementation of new project facilities could occur within active oil wellfields. In the event that construction of the proposed project would occur within an active wellfield, the Authority would be required to accommodate existing and future drill islands in the project area to ensure that access to underlying mineral rights may continue during construction and operation of the proposed project. As a result, implementation of the proposed project would not impede future access to subsurface mineral resources of regional importance, and impacts would be less than significant. The No Project

Alternative would not involve implementation of recovery, recharge, storage and conveyance facilities within the project area which could impact oil resources. As a result, the No Project Alternative would result in fewer impacts to mineral resources when compared to the proposed project.

Noise

The No Project Alternative would not involve any construction activities or operation of proposed facilities, and therefore would not involve activities that would generate noise above baseline conditions. The proposed project would result in potentially significant impacts to sensitive receptors (occupied residential dwellings) and ambient noise levels during project well construction, which would require 24-hour drilling for extended periods of time. With implementation of a mitigation measure, best management practices regarding construction noise would reduce this potential impact to a less than significant level. Since the No Project Alternative would not alter the existing noise environment with the construction of recovery wells, there would be lesser impacts associated with noise when compared to the proposed project.

Transportation

The No Project Alternative would not result in construction activities or operation of any additional facilities within the project area. The proposed project would result in temporary impacts to traffic and the circulation system due to increased vehicle trips during construction, potentially increase hazards due to a design feature or incompatible uses, and/or result in inadequate emergency access. The proposed project impacts would be reduced to less than significant levels with implementation of a Traffic Control Plan and HAZ-4, which requires coordination with construction haul routes to ensure safety for neighboring uses during construction. Since the No Project Alternative would not involve any changes to the project area that could impact traffic and emergency access, the No Project Alternative would result in fewer impacts when compared to the proposed project.

Tribal Cultural Resources

Under the No Project Alternative, no new ground disturbing activities would occur. Therefore, the No Project Alternative would not affect any known or unknown tribal cultural resources. The proposed project would also not result in any impacts to tribal cultural impacts; therefore, the No Project Alternative would result in similar impacts as the proposed project.

Utilities and Service Systems

The No Project Alternative would not result in construction activities or operation of any additional facilities within the project area. As a result, the No Project Alternative would not result in any impacts to utilities and service systems. The proposed project would similarly not result in significant impacts to utilities and service systems; however, because the No Project Alternative would not construct facilities, it would not require or result in the relocation or construction of new or expanded water, wastewater, drainage, electric, natural gas, or telecommunication facilities. Further, the No Project Alternative would not generate solid waste.

Therefore, the No Project Alternative would result in fewer impacts when compared to the proposed project.

Wildfire

The No Project Alternative would not result in construction activities or operation of any additional facilities within the project area and therefore would not expose construction personnel or structures to wildfire risks. The proposed project would result in potentially significant impacts regarding the impairment of an adopted emergency respond or evacuation plan as there will be more truck traffic on local roadways within the project area; however, implementation of the Traffic Control Plan would reduce this significant impact to a less than significant level. Because the No Project Alternative would not introduce increased vehicle trips in the project area during construction, the No Project Alternative would result in fewer impacts when compared to the proposed project.

6.4.2 Water Bank Alternative

As stated previously, the Water Bank Alternative would involve participation in the Willow Springs Water Bank (WSWB). WSWB is located in the Antelope Valley near the border of Kern County and Los Angeles County in Southern California. The Southern California Water Bank Authority is proposing to implement the WSWB Conjunctive Use Project to capture and store high flows from the Delta (DWR Article 21 water). Similar to the proposed project, the WSWB Conjunctive Use Project has received a conditional funding award by the CWC through the WSIP. The WSWB Conjunctive Use Project would include a regulating reservoir and additional extraction wells, along with new conveyance facilities to move water to and from the California Aqueduct.

The WSWB Conjunctive Use Project is partially constructed; once fully constructed, the WSWB would be capable of recharging 250,000 AFY, storing 1,000,000 AF of water underground, and recovering 225,000 AFY (Rosamond Community Services District 2018). The WSWB Conjunctive Use Project would consist of approximately 1,100 acres of recharge basins and 77 recovery wells, as well as a 9-mile pipeline connecting to the California Aqueduct, within an overall area of approximately 8,650 acres. As of 2018, 20,000 AFY of imported water has been recharged in the 320-acre basins that have been constructed; none of the stored water has been recovered yet (Rosamond Community Services District 2018). The rest of the WSWB Conjunctive Use Project is expected to be constructed by 2022.

The WSWB is located in the adjudicated Antelope Valley Groundwater Basin, which is south and east of Bakersfield and the Tehachapi Mountains. The WSWB is situated on highly permeable soils near three major water conveyance facilities: East Branch of the California Aqueduct, the Antelope Valley-East Kern (AVEK) West Feeder, and the Los Angeles Aqueduct and offers water storage opportunities to both upstream and downstream water agencies (IRWD and Rosedale 2020).

The Southern California Water Bank Authority is proposing to implement the WSIP ecosystem benefits through water transfers with the SWP, whereby a SWP Contractor would use water from

the Project in lieu of SWP water. This would allow water stored in Lake Oroville to be dedicated to providing instream flow benefits. The WSWB Conjunctive Use Project proposes providing up to 40,000 AF of water per year to the Feather River in critically dry and dry years via pulse flow releases that would occur in April and May.

Under the Water Bank Alternative, the Authority would acquire capacity in the WSWB Conjunctive Use Project by initially purchasing shares of capacity where one share is equal to 5 AF of storage, 1/3 AF per year of recharge capacity, and 1 AF per year of recovery capacity. Based on the share structure of WSWB Conjunctive Use Project, recharge and recovery capacity is the limiting constraint for moving water into and out of the project facility. To have similar recharge and recovery capacities as compared with the proposed project, the Authority would need to acquire approximately 227,000 shares from WSWB (IRWD and Rosedale, 2020**).**

The Water Bank Alternative would operate on a concept where the Authority would deliver Article 21 and other SWP water supplies via the California Aqueduct and a 9-mile diversion pipeline to the WSWB Conjunctive Use Project's recharge basins. Water delivered to WSWB would need to be pumped to the turnouts on the East Branch of the California Aqueduct which adds substantial power costs to the delivered water. When the stored water is needed, it would be extracted through the WSWB Conjunctive Use Project wellfield and returned to the California Aqueduct for delivery. The water would be directly delivered to IRWD's service area through MWD. There would need to be an exchange with another SWP Contractor in order for Rosedale and IRWD (through Dudley Ridge Water District (DRWD)) to receive their share of stored water within the respective service areas, which are north of the WSWB on the SWP system (Authority 2020).

The storage, recovery and conveyance facilities within the WSWB that would be utilized as part of the Water Banking Alternative have not yet been fully developed and are part of the Southern California Water Bank Authority's WSWB Conjunctive Use Project. Therefore, under this Alterative, construction and operation of new facilities would be implemented, and the impacts associated with these activities are considered below. The WSWB Conjunctive Use Project was originally evaluated pursuant to CEQA in an EIR that was certified in 2006 by the Kern County Board of Supervisors (State Clearinghouse No. 2005091117). An Addendum to the 2006 EIR was prepared in 2018 to evaluate several modifications to the Project. The 2018 Addendum was reviewed and used to inform this analysis of the Water Bank Alternative.

Ability to Meet Project Objectives

As part of the Water Bank Alternative, the Authority would pay to buy into the developed capacities of the WSWB to store up to 100,000 AF of water. The water stored by the Authority could consist of a mix of unallocated Article 21 and non-Article 21 SWP water. The storage of CVP Section 215 water would not be possible. Only a portion of the project objectives identified as part of the proposed project would be realized with the Water Bank Alternative. Groundwater recharge and storage would occur in the Antelope Valley, and thus, the project objectives that are local to the Kern Fan area of Kern County would not be met. Participation in the WSWB would not generate ecosystem public benefits such as new intermittent wetland benefits in the Kern Fan area. Agricultural benefits resulting from crop substitution and improved groundwater levels,

Incremental Level 4 water to federal wildlife refuges, and groundwater sustainability in the Kern County Sub-basin would not occur. The Water Bank Alternative would only achieve one of the project objectives, which is to provide Rosedale and IRWD customers and existing partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted.

Impact Analysis

Aesthetics

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project. Therefore, the Water Bank Alternative has the potential to impact scenic vistas, scenic resources, visual character, or light and glare in the proposed project area because new facilities would be built. The proposed project would have a less than significant impact to scenic vistas and visual character after implementation of mitigation measures that require nighttime construction lighting and security lighting installed on new facilities to be shielded downward and away from neighboring properties. Since the Water Bank Alternative could alter above-ground facilities within the project area, it would result in similar aesthetic impacts as the proposed project.

Agriculture and Forestry Resources

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project. The WSWB is proposed to be developed within an overall area of approximately 8,650 acres, with recharge basins on approximately 1,100 acres of agricultural land in the Antelope Valley near Rosamond in Kern County. Therefore, the Water Bank Alternative has the potential to impact agricultural resources and FMMP-designated farmland such as Prime Farmland, Unique Farmland, and Farmland of Statewide Importance (Rosamond Community Services District 2018). The proposed project would not result in the conversion of Farmland to non-agricultural use and would have a less than significant impact to agricultural resources after implementation of mitigation to ensure consistency with Williamson Act Contracts. The proposed project also would directly benefit farmland in the project area by conveying and storing water in the Kern County Sub-basin that would later be extracted to provide water for irrigation of Farmland. Impacts and benefits to Kern County Farmland and agricultural resources would be similar under the Water Bank Alternative and could similarly be mitigated; therefore, impacts would be considered similar when compared to the proposed project.

Air Quality

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project. During construction, the proposed project could result in potentially significant cumulative net increases of criteria pollutants within the project area and expose sensitive receptors to pollutant concentrations; however, mitigation measures would reduce the impacts to less than significant levels. The Water Bank Alternative has the potential to generate emissions above baseline conditions that could impact air quality as well. The WSWB is located in a different air basin than the proposed project, within the boundaries of the Eastern Kern Air Pollution Control District. Mitigation measures would be

required to ensure air emission associated with construction of the WSWB Conjunctive Use Project would be below significance thresholds (Rosamond Community Services District 2018). As such, the Water Bank Alternative is anticipated to result in similar air quality impacts when compared to the proposed project.

Biological Resources

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project and would therefore alter the existing site conditions within the project area and have the potential to adversely affect biological resources. The Water Bank Alternative could impact sensitive special-status species and sensitive natural communities during construction activities, such as the Joshua Tree Woodland Habitat, ephemeral drainages, Desert Tortoise, Swainson's Hawks, and Burrowing Owls. Impacts to biological resources would be mitigated to less-than-significant levels (Rosamond Community Services District 2018). The proposed project has the potential to impact special status species, such as the Blunt-Nosed Leopard Lizard, San Joaquin Kit Fox, and San Joaquin Kangaroo Rat, and/or sensitive natural communities, which would be reduced to less than significance levels with implementation of mitigation measures. Additionally, the proposed project would result in less than significant impacts regarding conflicts with local biological resources policies and ordinances and the MBHCP and Kern Water Bank HCP/NCCP with the implementation of mitigation measures.

The proposed project would benefit fishery ecosystems in the Delta, waterfowl and migratory birds in Kern County, and wetland habitats in Kern County when the project is recharging water. The proposed project would also provide incremental water to federal wildlife refuges. Implementation of the Water Bank Alternative would provide benefit to fishery ecosystem in the Delta through pulse flows from Lake Oroville to the Feather River. However, the Water Bank Alternative would not achieve beneficial effects to those biological resources that are local to Kern County, such as intermittent wetlands and wildlife refuges. As such, the Water Bank Alternative would result in fewer benefits, and therefore greater impacts, to biological resources when compared to the proposed project.

Cultural Resources

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project and therefore would result in ground disturbance that could disrupt or affect archaeological resources, historic resources, or human remains. Although the proposed project would not directly impact any known cultural resources, construction activities would involve grading and excavation that could significantly impact unknown/undiscovered cultural resources. With implementation of mitigation measures, the proposed project would result in less than significant impacts to unknown cultural resources. The Water Bank Alternative would require similar mitigation to reduce potential impacts to less than significant levels. Therefore, the Water Bank Alternative is anticipated to result in similar cultural resources impacts when compared to the proposed project.

Energy

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project and therefore would result in an increase in energy consumption relative to existing conditions. The proposed project would result in an increased usage of energy during construction and intermittent increases of energy usage during operational activities to pump and recover water, but not at significant levels that would result in wasteful use of energy. The proposed project would result in less than significant impacts in regards to conflicts with state or local renewable energy or energy efficiency plans. Under the Water Bank Alternative, water delivered to WSWB would need to be pumped to the turnouts on the East Branch of the California Aqueduct which adds substantial power costs to the delivered water when compared to the proposed project (IRWD and Rosedale 2019). When the stored water is needed, it would be extracted through the WSWB Conjunctive Use Project wellfield and returned to the California Aqueduct for delivery. The water would be directly delivered to IRWD's service area through MWD. This Water Bank Alternative would require a greater amount of energy to deliver water to recharge facilities and to pump recovered water to IRWD. Therefore, the Water Bank Alternative would result in an increased amount of energy use relative to the proposed project. As a result, the Water Bank Alternative would result in greater impacts to energy consumption when compared to the proposed project.

Geology and Soils

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project and therefore would result in ground disturbance that would disrupt or affect unique paleontological resources or unique geologic features. Similar impacts to paleontological resources could occur due to ground disturbance during construction of the proposed project. With implementation of mitigation measures, the proposed project would result in less than significant impacts to paleontological resources. The Water Bank Alternative would also require mitigation measures to protect paleontological resources and reduce potential impacts to less than significant levels. As a result, this Alternative would result in similar geological, soil, and paleontological impacts when compared to the proposed project.

Greenhouse Gas Emissions

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project and therefore would result in an increase in greenhouse gas emissions relative to existing conditions. The proposed project would result in greenhouse gas emissions during construction but not at significant levels. Because the Water Bank Alternative would include similar facilities as the proposed project, it is anticipated this alternative would result in similar greenhouse gas emissions impacts when compared to the proposed project.

Hazards and Hazardous Materials

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project. As a result, impacts regarding hazards and hazardous materials could occur. While the proposed project could create a hazard to the public

or environment through routine transport, use, disposal, or accidental release of hazardous materials, mitigation measures would implement soil sampling and Phase I Environmental Site Assessments (ESA) to reduce potential impacts to less than significant levels. Implementation of those same mitigation measures would reduce potential impacts to the public or environment due to being located on hazardous material sites to less than significant levels. Similarly, mitigation measures involving haul route coordination would reduce potential impacts of emitting hazardous materials within one-quarter mile of an existing school to less than significant levels. Additionally, implementation of the Traffic Control Plan would reduce potential impacts involving the impairment or physically interference with adopted emergency response and evacuation plans.

The Water Bank Alternative would also involve the transport or use of hazardous materials within the project area, and could introduce construction personnel or structures to hazardous sites, or impair/ interfere with emergency plans or routes. This Alternative would also require mitigation measures to reduce potential hazards impacts to less than significant levels. As a result, it is anticipated the Water Bank Alternative would result in similar impacts to hazards and hazardous materials when compared to the proposed project.

Hydrology and Water Quality

The Water Bank Alternative would include construction and operation of facilities similar to the proposed project, and therefore has the potential to violate water quality standards or waste discharge requirements, impact surface water drainages or groundwater levels, degrade groundwater quality, and place facilities within flood hazard zone. Under the proposed project, construction of new facilities would involve ground-disturbing activities that could impact surface water and groundwater quality due to polluted runoff from the soil stockpiling and construction sites. Such potential impacts would be mitigated with implementation of soil sampling and removal of contaminated soils from the project area and implementation of NPDES permit requirements and a SWPPP. The Water Bank Alternative would involve ground-disturbing activities and would have similar potential for impacts to water quality during construction, and would also implement similar mitigation measures to reduce impacts to less than significant levels.

Similar to the proposed project, operation of the Water Bank Alternative would result in temporary groundwater mounding during recharge events and temporary groundwater drawdown during recovery events. The WSWB operations are subject to mitigation measures that require groundwater monitoring to identify any potential adverse effects of groundwater level drawdown on offsite neighboring wells and remedial measures to adjust the WSWB operations in the event that groundwater levels drop to unacceptable levels at neighboring wells, or provision of an alternate source of water if necessary (Rosamond Community Services District 2018). The proposed project would similarly be required to monitor groundwater levels in accordance with Rosedale's Long Term Operations Plan and implement measures to mitigate adverse effects to neighboring wells as necessary and applicable. As a result, the Water Bank Alternative would result in similar impacts to groundwater when compared to the proposed project.

Similar to the proposed project, the Water Bank Alternative would provide beneficial impacts related to increasing groundwater supplies and groundwater sustainability through recharge of water into the Antelope Valley Groundwater Basin. The Antelope Valley Groundwater Basin is an adjudicated basin and therefore not subject to the SGMA requirements for implementation of a GSP. Nonetheless, the Water Bank Alternative would result in benefits to groundwater supplies and sustainability. The WSWB would provide for at least 10 percent of stored water that would not be recovered but would remain in the groundwater basin (Rosamond Community Services District 2018). This would have a beneficial effect on groundwater supplies, and therefore would have no impact in terms of depletion of groundwater supplies in the aquifer due to recharge. Overall, the Water Bank Alternative would result in similar impacts and benefits to hydrology, water quality, and groundwater when compared to the proposed project.

Land Use and Planning

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project. Under the proposed project, implementation of new project facilities could conflict with a state or County land use plan, policy or regulation. However, implementation of mitigation measures to ensure consistency with Williamson Act Contracts and to protect and preserve biological resources would reduce potential impacts to less than significant levels. In addition, the proposed project would be consistent with SGMA by supporting sustainable groundwater management. It was determined that the Water Bank Alternative would not interfere or conflict with existing land uses within the project area, or impact land uses and biological resources within habitat conservation plans. The WSWB is located within the Bureau of Land Management's West Mojave Plan and Desert Renewable Energy Conservation Plan. However, these Plans are only applicable to projects located on public lands, and the WSWB is not located on public lands (Rosamond Community Services District 2018). As a result, the Water Bank Alternative would result in fewer impacts to land use and planning when compared to the proposed project.

Mineral Resources

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities in areas that do not include mineral resource zones (Rosamond Community Services District 2018), similar to the proposed project. However, under the proposed project, implementation of new project facilities could occur within active oil wellfields. In the event that construction of the proposed project would occur within an active wellfield, the Authority would be required to accommodate existing and future drill islands in the project area to ensure that access to underlying mineral rights may continue during construction and operation of the proposed project. As a result, implementation of the proposed project would not impede future access to subsurface mineral resources of regional importance, and impacts would be less than significant. The Water Bank Alternative would not involve implementation of storage, recovery, and conveyance facilities in an area that could impact oil resources. As a result, this alternative would result in fewer impacts to mineral resources when compared to the proposed project.

Noise

The Water Bank Alternative would include construction and operation of facilities similar to the proposed project and therefore would involve activities that could generate noise above baseline conditions. The proposed project would result in potentially significant impacts to sensitive receptors and ambient noise levels during project well construction which would require 24-hour drilling for extended periods of time. With implementation of a mitigation measure, best management practices regarding construction noise would reduce this potential impact to a less than significant level. Since the Water Bank Alternative would also require noise mitigation measures to reduce potential impacts to less than significant levels (Rosamond Community Services District 2018), this alternative would result in similar noise impacts as the proposed project.

Transportation

The Water Bank Alternative would include construction and operation of facilities similar to the proposed project. The proposed project would result in temporary impacts to traffic and the circulation system due to increased vehicle trips during construction, potentially increase hazards due to a design feature or incompatible uses, and/or result in inadequate emergency access. The proposed project impacts would be reduced to less than significant levels with implementation of a Traffic Control Plan and HAZ-4, which requires coordination with construction haul routes to ensure safety for neighboring uses during construction. The Water Bank Alternative would implement similar facilities as the proposed project and would require mitigation measures to reduce potential impacts regarding traffic hazards and emergency access to less than significant levels. Therefore, this alternative would result in similar transportation impacts as the proposed project.

Tribal Cultural Resources

The Water Bank Alternative would include construction and operation of recharge, recovery, storage and conveyance facilities similar to the proposed project and therefore, new ground disturbing activities would occur. The proposed project would not result in any impacts to tribal cultural impacts. Tribal cultural resources were not analyzed for the Water Bank Alternative (Rosamond Community Services District 2018); and therefore, implementation of this alternative could result in impacts to tribal cultural resources within that project area. The Water Bank Alternative would mostly likely require mitigation measures to reduce potential impacts regarding tribal cultural resources. Therefore, the Water Bank Alternative would result in greater potential impacts to tribal cultural resources when compared to the proposed project.

Utilities and Service Systems

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities similar to the proposed project. The proposed project would not result in significant impacts to utilities and service systems. Because the Water Bank Alternative would implement similar facilities as the proposed project, the WSWB would also result in less than significant impacts to utilities and service systems (Rosamond Community Services District

2018). Therefore, this alternative would result in similar impacts to utilities and service systems as the proposed project.

Wildfire

The Water Bank Alternative would include construction and operation of storage, recovery, and conveyance facilities and therefore could expose construction personnel or structures to wildfire risks similar to the proposed project. The proposed project would result in potentially significant impacts regarding the impairment of an adopted emergency respond or evacuation plan as there will be more truck traffic on local roadways within the project area; however, implementation of the Traffic Control Plan would reduce this significant impact to a less than significant level. Because the Water Bank Alternative would introduce increased vehicle trips in the project area during construction as well, this alternative would result in similar impacts as the proposed project.

6.5 Environmentally Superior Alternative

CEQA requires that a Draft EIR identify the environmentally superior alternative of a project other than the No Project Alternative (*CEQA Guidelines* Section 15126.6(e)(2)). One of the primary purposes of the alternatives analysis is to identify project alternatives that may avoid or substantially lessen significant project impacts (*CEQA Guidelines* Section 15126.6). With incorporation of mitigation measures, the proposed project would result in no Significant and Unavoidable impacts.

As stated above and summarized in **Table 6-2**, the No Project Alternative would avoid all of the mitigated environmental impacts associated with the proposed project, but would not meet all of the project objectives. Because the proposed project does not result in any Significant and Unavoidable impacts, the No Project Alternative does not avoid or substantially lessen significant environmental effects.

TABLE 6-2
SUMMARY OF ALTERNATIVES ANALYSIS
IMPACTS AS COMPARED TO THE PROPOSED PROJECT

Environmental Resource	Proposed Project	No Project Alternative	Water Bank Alternative
Meets All Project Objectives?	Yes	No	No
Environmental Impacts			
Aesthetics	LTSM	-	0
Agriculture and Forestry Resources	LTSM	-	0
Air Quality	LTSM	-	0
Biological Resources	LTSM	+	+
Cultural Resources	LTSM	-	0
Energy	LTS	-	+
Geology and Soils	LTSM	-	0
Greenhouse Gas Emissions	LTS	-	0
Hazards and Hazardous Materials	LTSM	-	0
Hydrology and Water Quality	LTSM	-	0
Land Use and Planning	LTSM	-	-
Mineral Resources	LTS	-	-
Noise	LTSM	-	0
Transportation	LTSM	-	0
Tribal Cultural Resources	NI	0	+
Utilities and Service Systems	LTS	-	0
Wildfire	LTSM	-	0

Source: ESA 2020; (+) Greater Impacts; (-) Lesser Impacts; (0) Similar Impacts

The Water Bank Alternative would result in many similar environmental impacts to the proposed project but would not achieve all the project objectives. This alternative would implement similar storage, recovery, and conveyance facilities as the proposed project, but within a different location, in the Antelope Valley at the border of Kern County with Los Angeles County, and a different groundwater basin. Implementation of this alternative could lessen impacts to land use and mineral resources, as described above. However, the Water Bank Alternative would need to operate longer lengths of conveyance facilities in order to deliver water to/from the East Branch of the California Aqueduct and to/from the WSWB facilities. This would increase the energy demand associated with this alternative to levels above the proposed project. Further, since implementation of the Water Bank Alternative would not occur within the Kern Fan area, the local benefits to groundwater sustainability for the Kern County Sub-basin, benefits to wetland habitat, and Incremental Level 4 water for federal wildlife refuges would not take place, resulting in greater impacts to biological resources and groundwater resources.

Because the proposed project does not result in any Significant and Unavoidable impacts, the Water Bank Alternative does not avoid or substantially lessen significant environmental effects. The Water Bank Alternative would only achieve one of the project objectives, which is to provide Rosedale and IRWD customers and existing partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted. Only the proposed project would fully achieve all of the project objectives.

Implementation of the Water Bank Alternative also would reduce benefits to the Delta ecosystem associated with pulse flows from Lake Oroville into the Feather River. If the Authority participates in the WSWB Conjunctive Use Project instead of constructing and operating the proposed project, DWR would forgo the availability of 18,000 to 25,000 AF of pulse flows associated with the proposed project. If the Authority proceeds with the proposed project, then other entities would participate in the WSWB Conjunctive Use Project, and together both groundwater banking projects would have to potential to provide DWR with up to 65,000 AF of water for pulse flows and benefits to fishery resources.

6.6 References

IRWD, 2016. *2015 Urban Water Management Plan*. June 2016.

IRWD, 2018. Irvine Ranch Water District Policy Position, Water Use Efficiency and Conservation. January 26, 2018.

IRWD, 2020a. Recycled Water Reservoirs. Accessed: https://www.irwd.com/construction/recycled-water-reservoirs, on August 13, 2020.

IRWD, 2020b. 50 Years of Recycled Water. Accessed: irwd.org, on August 13, 2020.

IRWD and Rosedale, 2020. *Kern Fan Groundwater Storage Project Feasibility Report*. October 21, 2019, updated April 13, 2020.

Rosamond Community Services District, 2018. *Addendum to the Environmental Impact Report for the Willow Spring Water Bank Project (formerly Antelope Valley Water Bank Project)*. State Clearinghouse No. 2005091117). July 2018.

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CHAPTER 7
Report Preparers

The purpose of this chapter is to meet requirements described in Section 15129 of the *CEQA Guidelines*, Organizations and Persons Consulted, which states the following regarding EIRs prepared pursuant to CEQA:

> *"The EIR shall identify all federal, state, or local agencies, other organizations, and private individuals consulted in preparing the draft EIR, and the persons, firm, or agency preparing the draft EIR, by contract or other authorization (Authority Cited: Section 21083, Public Resources Code; Reference: Sections 21104 and 21153, Public Resources Code)."*

Lead Agency

Groundwater Banking Joint Powers Authority
849 Allen Road
Bakersfield, CA 93314

Eric Averett, General Manager

Responsible Agency/Partner

Rosedale-Rio Bravo Water Storage District
849 Allen Road
Bakersfield, CA 93314

Eric Averett, General Manager
Dan Bartel, Assistant General Manager/Engineer

Irvine Ranch Water District
15600 Sand Canyon Blvd
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Fiona Sanchez, Director of Water Resources
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KERN FAN GROUNDWATER STORAGE PROJECT

Draft Environmental Impact Report – Appendices

Prepared for
Groundwater Banking Joint Powers Authority:
Rosedale-Rio Bravo Water Storage District and
Irvine Ranch Water District

October 2020

ESA

KERN FAN GROUNDWATER STORAGE PROJECT

Draft Environmental Impact Report – Appendices

Prepared for
Groundwater Banking Joint Powers Authority:
Rosedale-Rio Bravo Water Storage District and
Irvine Ranch Water District

October 2020

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Appendix A
Public Scoping

ESA

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Scoping Summary

date	September 11, 2020
to	Dan Bartel, Assistant General Manager/District Engineer, Rosedale-Rio Bravo Water Storage District Jo Ann Corey, Environmental Compliance Specialist, Irvine Ranch Water District Kellie Welch, Water Resources Manager, Irvine Ranch Water District
from	Jennifer Jacobus, CEQA Project Manager, ESA
subject	Kern Fan Groundwater Storage Project California Environmental Quality Act Public Scoping Summary

Introduction

The Authority is proposing to implement the Kern Fan Groundwater Storage Project (proposed project) in western Kern County. The proposed project would involve the construction and operation of water conveyance, recharge and recovery facilities. The proposed recharge and recovery facilities would be constructed in two phases on approximately 1,300 acres of agricultural or vacant land within or near the Rosedale service area. The proposed project would also involve the acquisition of easements for construction, operation and maintenance of proposed Kern Fan Conveyance Facilities that would deliver water to and from the California Aqueduct. Implementation of the proposed facilities would allow the Authority to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin.

Notice of Preparation

The Notice of Preparation (NOP) was prepared pursuant to Section 15082 of the California Environmental Quality Act (CEQA) Guidelines, to notify interested parties that Rosedale and IRWD will be preparing an Environmental Impact Report (EIR) to evaluate potential environmental impacts of the proposed project (see Attachment 1). The NOP was mailed on April 8, 2020 to interested parties, including local, state, and federal agencies; local tribes; and other groups or individuals who had previously expressed interest in the project. The NOP also was posted by the County Clerk in Kern and Orange Counties. A Notice of Completion (NOC) was also prepared by the Authority and sent to the State Clearinghouse. The proposed project was given a State Clearinghouse number of SCH# 2020049019, and the project information was posted in the CEQAnet Database. Copies of the NOP were made available for public review online at Rosedale and IRWD Websites at the following locations:

- https://www.rrbwsd.com/newsletter-notices
- https://www.irwd.com/doing-business/environmental-documents

Scoping Period

The 45-day project scoping period began with the distribution of the NOP on April 8, 2020 and remained open through May 8, 2020 at 4:00 p.m. During the scoping period, one virtual scoping meeting was held on April 29, 2020 via Zoom. Public notices of the virtual scoping meeting were placed in the Orange County Register and Bakersfield Californian newspapers. Public notices of the scoping meeting were also mailed directly to relevant state, Federal, regional and local agencies.

At the scoping meeting, ESA gave a presentation on the proposed project and the CEQA process. Including ESA and Authority staff, approximately 24 meeting participants attended the virtual scoping meeting. The Zoom Chat function was available for participants to ask questions or comment. There were no written comments received in the Zoom Chat during the meeting. Participant questions pertained to the locations of the recharge and recovery facilities and the location of the Aqueduct turnout.

Comments

During the scoping period, the Authority received a total of eight comment letters on the proposed project via mail and e-mail. Table 1 below includes a list of the agencies and individuals that submitted comments during the 30-day project scoping period. CEQA does not require the Authority to formally respond to these comments, but rather to consider these comments during preparation of the EIR.

TABLE 1
LIST OF COMMENTERS

Commenter	Date Received (2020)
Native American Heritage Commission	April 9
Dudley Ridge Water District	April 24
Department of Toxic Substance Control	April 27
California Department of Fish and Wildlife	May 7
City of Bakersfield	May 8
Kern County Water agency	May 8
California Department of Water Resources	May 8
Kern Water Bank Authority	May 8

List of Attachments

This Scoping Summary contains documents pertinent to the scoping process. The following items are included:

- Notice of Preparation
- Notice of Completion
- Public Notice of Scoping Meeting
- Comment Letters Received by the Authority

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

DATE: April 8, 2020

TO: Responsible and Trustee Agencies and Interested Parties

SUBJECT: Notice of Preparation of an Environmental Impact Report

PROJECT: Kern Fan Groundwater Storage Project

LEAD AGENCY: Rosedale-Rio Bravo Water Storage District

This Notice of Preparation (NOP) has been prepared to notify agencies and interested parties about the initiation of a California Environmental Quality Act (CEQA) review for the Kern Fan Groundwater Storage Project ("proposed Project") that Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) will jointly carry out through the Groundwater Banking Joint Powers Authority (Authority). Pursuant to CEQA Guidelines section 15051(d), Rosedale will serve as the Lead Agency for the preparation of an Environmental Impact Report (EIR) until the Authority is formed. Rosedale and IRWD have agreed that Rosedale will perform the lead agency role until the Authority is formed, and the Authority will assume the role thereafter. In addition, the EIR will be prepared in accordance with the CEQA-Plus requirements of the U.S. Environmental Protection Agency, to fulfill the requirement of potential federal funding partners to comply with the National Environmental Policy Act (NEPA).

The proposed Project would allow Rosedale and IRWD to more effectively manage sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop a water bank and associated water conveyance facilities in the Kern Fan area of Kern County, California (**Figure 1**). The proposed Project would recharge, store, recover, and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and provide supply reliability for agricultural, municipal and industrial uses. The proposed Project would include construction and operation of water conveyance water recharge and recovery facilities.

PROJECT LOCATION: Rosedale and IRWD would partner to implement the proposed Project through the agreements set forth by the Authority. Up to 1,300 acres of land would be acquired for the proposed Project within or near Rosedale's service area in western Kern County for the construction and operation of the proposed Project. The proposed Project would also involve the acquisition of easements for construction, operation and maintenance of the new Kern Fan Conveyance Facilities that would deliver water to and from the California Aqueduct.

PUBLIC REVIEW AND COMMENTS: Rosedale is soliciting comments from responsible and trustee agencies as well as interested parties as to the scope and content of the environmental information to be included in the EIR. In accordance with CEQA, agencies are requested to review the proposed Project description provided in this NOP (see Attachment A) and to provide comments on environmental issues related to the statutory responsibilities of each responsible or trustee agency. The EIR may be used by Rosedale, IRWD and the Authority when considering approval of the proposed Project as well as any related discretionary approvals.

COMMENT PERIOD: In accordance with the time limits mandated by CEQA, comments on the NOP must be received no later than 30 days after publication of this notice. Please send your comments to the contact person shown below, by 4:00 p.m. on May 8, 2020. Please include a return address and contact name with your comments.

Contact: Eric Averett
General Manager
Rosedale-Rio Bravo Water Storage District
P.O. Box 20820
Bakersfield, CA 93390-0820
Telephone: (661) 589-6045
Email: eaverett@rrbwsd.com

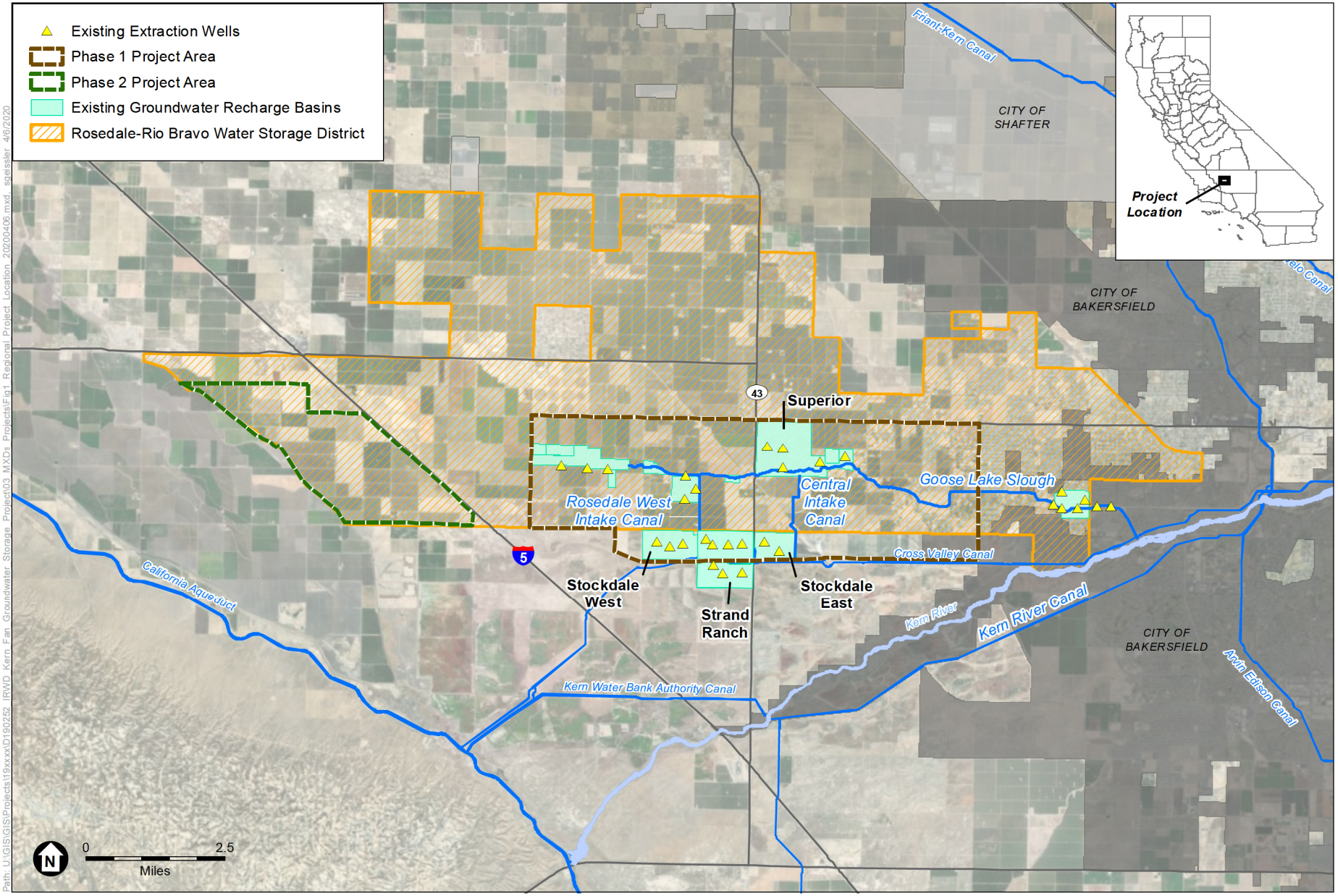
DOCUMENT AVAILABILITY: The NOP may be downloaded from the Rosedale and IRWD Websites at the following locations:

- https://www.rrbwsd.com/newsletter-notices
- https://www.irwd.com/doing-business/environmental-documents

SCOPING MEETINGS: One public meeting will be conducted virtually utilizing Zoom and telephonically to receive comments and suggestions concerning the issues to be included in the EIR. The scoping meeting will include a brief presentation, providing an overview of the proposed Project. After the presentation, public comments will be accepted orally. Written comments also may be submitted anytime during the 30-day NOP review period ending at 4:00 p.m. on May 8, 2020. The scoping meeting will be held as follows:

Virtual Scoping Meeting Details

Date:	April 29, 2020
Time:	9:00 AM
Zoom:	https://zoom.us/join
Telephone Dial-in:	(669) 900-6833
Meeting ID:	646 423 721
Meeting Password:	447 319
Submit Written Comments to:	Eric Averett General Manager Rosedale-Rio Bravo Water Storage District P.O. Box 20820, Bakersfield, CA 93390-0820 eaverett@rrbwsd.com



SOURCE: ESRI; Kern County

Kern Fan Groundwater Storage Project

Figure 1

Regional Project Location

ESA

ATTACHMENT A
Kern Fan Groundwater Storage Project

1. Introduction

This Notice of Preparation (NOP) initiates California Environmental Quality Act (CEQA) review for the Kern Fan Groundwater Storage Project ("proposed Project") that Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) propose to jointly carry out through the Groundwater Banking Joint Powers Authority (Authority). Pursuant to CEQA Guidelines section 15051(d), until the Authority is formed, Rosedale will serve as the Lead Agency under CEQA for the preparation of an Environmental Impact Report (EIR). Rosedale and IRWD have agreed that Rosedale will perform the lead agency role until the Authority is formed, and the Authority will assume the role thereafter. In addition, the EIR will be prepared in accordance with the CEQA-Plus requirements of the U.S. Environmental Protection Agency, to fulfill the requirement of potential federal funding partners to comply with the National Environmental Policy Act (NEPA).

The proposed Project would allow Rosedale and IRWD to more effectively manage sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County, California (Figure 1). The proposed Project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial (M&I) uses. The proposed Project would involve the construction and operation of water conveyance, recharge and recovery facilities.

2. Project Background

Rosedale-Rio Bravo Water Storage District

Rosedale is located west of Bakersfield and encompasses approximately 44,150 acres in Kern County, with 27,500 acres developed as irrigated agriculture and approximately 7,500 acres developed for urban uses. Rosedale's service area overlies the Kern County Sub-basin ("sub-basin") of the larger San Joaquin Valley Groundwater Basin, and was established in 1959 to develop a groundwater recharge program to offset overdraft conditions in the underlying sub-basin. Rosedale currently manages more than 500,000 acre-feet (AF) of stored water in the underlying sub-basin, which has an estimated total storage capacity in excess of 1.7 million AF. Water supplies for Rosedale's programs, including its Conjunctive Use Program, are provided by participating water agencies and include high-flow Kern River water and supplies from the Central Valley Project (CVP) and SWP. Currently, the infrastructure for Rosedale's programs

includes over 1,000 acres of recharge basins and several recovery wells (Figure 1). The Conjunctive Use Program and other Rosedale programs provide a maximum annual recharge of more than 250,000 acre-feet per year (AFY), maximum annual recovery of more than 60,000 AFY, and underground storage of more than 1,000,000 AF.

Irvine Ranch Water District

IRWD was established in 1961 as a California Water District pursuant to the California Water District Law (California Water Code, Division 13). IRWD provides drinking water, sewage collection and treatment, recycled water and urban runoff treatment to approximately 422,000 residents encompassing 181 square miles in central Orange County. IRWD has a diverse water supply that includes local groundwater, recycled water, imported water, local surface water, and water banking facilities. Approximately 54 percent of the IRWD water supply comes from 26 local groundwater wells; 18 percent is imported from the Metropolitan Water District of Southern California; and 26 percent from recycled water.

IRWD currently participates in Rosedale's Conjunctive Use Program through IRWD's Strand Ranch Integrated Banking Project and Stockdale Integrated Banking Project (Stockdale Project) (Figure 1).

State Water Project

The California Department of Water Resources (DWR) delivers water to 29 SWP contractors through the California Aqueduct, including 21 contractors located south of the Sacramento-San Joaquin River Delta. The SWP Water Supply Contract for each contractor includes a "Table A" amount specifying the maximum amount of SWP water that can be requested for delivery each year. DWR's initial Table A water allocation in early winter typically is adjusted through spring to reflect the evolving variable conditions affecting water availability. Rosedale currently receives SWP Table A water through a water supply contract with Kern County Water Agency, an SWP contractor. IRWD is a landowner in the Dudley Ridge Water District, which is also an SWP contractor.

In addition to allocating Table A water, DWR periodically makes water supplies available under Article 21of the SWP contracts. "Article 21" states that DWR will offer to sell and deliver water during a year in which a surplus is available. The proposed Project would increase Kern County's ability to capture, store and reregulate Article 21 water for beneficial use. In certain circumstances, when the amount of Article 21 water is greater than existing SWP contractor demands ("unallocated"), the proposed Project would increase the overall water within the SWP system, reduce the loss of water to the ocean, and provide ecosystem benefits in accordance with the proposed Project's funding conditions.

Previous CEQA Documentation

An EIR was prepared, certified, and approved by Rosedale and IRWD in December 2015 for the Stockdale Project. The EIR evaluated the Stockdale East and Stockdale West recharge and recovery sites (Figure 1), and a potential third project site (collectively Stockdale Properties) that would be located within the vicinity of both east and west properties. Because the location of the

third project site had not been identified, a program level analysis of impacts was provided in the EIR. All or a portion of the third project site analyzed at a program level in the Stockdale Project's EIR may be designated as Phase 1 under the proposed Project. Phase 2 of the proposed Project would involve construction and operation of additional recharge and recovery facilities within or near the Rosedale service area.

3. Project Objectives

The objectives of the proposed Project are as follows:

- Capture, recharge and store water from the SWP, and other available water supplies for later use.
- Provide ecosystem public benefits, emergency water supply public benefits during extended droughts or a Delta levee failure, and water supply benefits for agricultural and M&I uses.
- Provide operating flexibility for Rosedale's existing and future conjunctive use programs.
- Assist in achieving groundwater sustainability within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin through implementation of projects consistent with California Executive Order N-10-19 directing state agencies to develop a "water resilience portfolio."
- Provide Rosedale and IRWD customers and partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted.

4. Purpose and Need for the Project

California has a Mediterranean climate with a highly variable precipitation and hydrology regime; typically, each year includes a winter wet season when water demand is lowest and a summer dry season when water demand is highest. The result of a highly-variable hydrologic regime is the periodic availability of surface water supplies that exceed demands but cannot be utilized due to insufficient storage capacity. Additionally, during dry years and extreme drought conditions, there are insufficient water supplies to meet demands. To improve availability and reliability of water supplies, additional capture and storage is needed for sustainable water supply management in California. The purpose of the proposed Project is to increase the reliability of water supplies during dry years by capturing and storing surplus surface water that would otherwise be lost.

The proposed Project has received a conditional award of funding through the California Water Commission's Water Storage Investment Program (WSIP). The WSIP is funded by the Proposition 1 Water Quality, Supply and Infrastructure Act of 2014. The purpose of the WSIP is to fund water storage projects that provide public benefits, improve operation of the state water system, and provide a net improvement in ecosystem and water quality conditions. The proposed Project was analyzed in the Storage Integration Study (2017) prepared by the Association of California Water Agencies. This study defined and quantified the benefits of integrating the operation of new storage projects with existing SWP and CVP operations to help fulfill statewide water supply needs and priorities. Eight projects were described in this study that could provide

such benefits, including the proposed Project.

There is approximately 1.7 million AF of storage within the aquifer underlying the Rosedale service area. The purpose of the proposed Project is to augment the recharge, storage, and extraction capabilities of existing programs and provide greater operational flexibility to Rosedale. By storing additional surface water underground in Kern County, the proposed Project would benefit groundwater levels in the Kern County Sub-basin and help support groundwater sustainability efforts required by the Sustainable Groundwater Management Act. In addition, the proposed Project would enhance water supply reliability for IRWD and its partners by augmenting supplies for periods when other sources may be limited or unavailable.

The proposed Project is consistent with water management goals of California. In its Water Resiliency Portfolio (2020), the State renewed its commitment to integrated water management as a means to provide reliable, sustainable and secure water resources and management systems, which includes improving water supply reliability, reducing groundwater overdraft and land subsidence, and protecting water quality and environmental conditions.

5. Project Location

The proposed Project would be located in western Kern County, west of the City of Bakersfield. The proposed recharge and recovery facilities would be constructed in two phases on approximately 1,300 acres of agricultural or vacant land within or near the Rosedale service area (Figure 1).

6. Project Description

The proposed Project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. The Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the project facilities and the California Aqueduct. Water stored by the proposed Project would be recovered when needed to provide ecosystem and water supply benefits.

The proposed Project would be operated such that surplus surface water from the SWP and other available water sources would be recharged and stored for subsequent recovery. It is estimated that the Project would be able to recharge and store approximately 100,000 AFY. Project capacities are to be allocated as follows:

Up to 25 percent, or up to 25,000 AF, of the “unallocated” Article 21 water would be stored for DWR in an “Ecosystem Account.” Through the implementation of 1-for-1 exchanges, the water stored in the Ecosystem Account would be used by the State of California to alleviate stress on endangered and threatened species in the Sacramento-San Joaquin River Delta during critically dry years.

The remaining 75,000 AF of storage capacity would be divided equally, with 37,500 AF of storage capacity allocated to Rosedale and 37,500 AF of storage capacity allocated to IRWD. Rosedale and IRWD would use the water recharged in their respective accounts for agriculture and M&I uses, improving water supply reliability during droughts and emergencies.

The proposed Project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area (Figure 1). Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and a new turnout and conveyance system (Kern Fan Conveyance Facilities) connecting to the California Aqueduct. Project operations would be coordinated with Rosedale's Conjunctive Use Program. The following sections describe the proposed facilities.

Recharge Facilities

The proposed Project would include the construction of recharge basins of varying shape, size and depth within approximately 1,300 acres. Basins would be formed by excavating and contouring existing soils to form earthen berms. Typical basin berms would be approximately 3 to 6 feet above ground.

Dirt roads approximately 14 to 20 feet wide would run along the perimeter of and in between all basins to provide access to facilities during operation and maintenance activities. Surface water would be delivered to the basins for recharge through the new Kern Fan Conveyance Facilities, and the basins would be connected by check structures to allow recharge water to flow by gravity among basins. The basins would be managed to allow agricultural land uses (e.g., annual farming or grazing) to continue when the basins are empty.

Recharge Water Supplies

The proposed Project would receive, recharge and store SWP Article 21 water, which is a surplus supply managed by DWR, as described above. Other water supplies also may be secured and acquired by Rosedale and IRWD from various sources, that may include federal, state, and local supplies through transfers, balanced and unbalanced water exchange agreements, water purchases or temporary transfers, or other available means. Sources may also include supplies from the CVP, and high-flow Kern River water depending on annual hydrologic availability, water rights and regulatory considerations.

Recovery Facilities

The proposed Project would construct up to 12 extraction wells, with an anticipated annual recovery capacity of up to 50,000 AF. Each well would be designed to pump groundwater at a recovery rate of approximately 5 to 6 cubic feet per second (cfs). Actual recovery rates for each well may be slightly more or less based on aquifer conditions at each well site. If higher production is achieved for the first few wells installed, fewer wells may be needed. Additionally, if any agricultural wells exist on the recharge basin sites, these could potentially be used as production wells or monitoring wells. The proposed recovery facilities would be designed and located to minimize potential effects on wells pumping on adjacent properties, similar to the wells constructed for the Stockdale Project.

Conveyance Facilities

The proposed Project includes a new turnout, additional canals and pipelines, and pump stations (collectively the "Kern Fan Conveyance Facilities") to convey water to and from the California Aqueduct and proposed recharge and recovery facilities. The exact locations of the new

conveyance facilities have not yet been determined but would have up to 500 cfs of conveyance capacity. Subject to necessary approvals, water could be conveyed through the SWP, Friant-Kern Canal or the Kern River by exchange through the Goose Lake Channel, or from the Cross Valley Canal (CVC) through the Rosedale Intake Canal.

Groundwater recovered from the Project extraction wells would be conveyed through new pipelines that would be below ground, running along the dirt roads between the recharge basins or buried in the basin bottoms, with exact locations subject to final well placement, similar to existing facilities constructed by Rosedale and IRWD for the Stockdale Project. The recovery pipelines would connect to the new Kern Fan Conveyance Facilities or could connect to the CVC via existing conveyance facilities.

7. Discussion of Environmental Effects

In accordance with Section 15126 of the CEQA Guidelines, the EIR will assess the physical changes to the environment that will likely result from construction and operation of the proposed Project, including direct, indirect and cumulative effects and growth-inducing effects. The EIR will assess the significance of any adverse physical effects from facilities and activities associated with construction and operation of the proposed Project (CEQA Guidelines Section 15161). Recovery operations for the Project will be analyzed at a programmatic level (CEQA Guidelines Section 15168); other Project elements will be analyzed at a project level (CEQA Guidelines Section 15161). The EIR will identify any feasible mitigation measures if necessary to avoid or reduce any significant adverse effects of the proposed Project. The EIR also will assess a no-project alternative and will evaluate a reasonable range of feasible alternatives to the proposed Project, if such alternatives were needed to avoid or reduce any significant adverse effects of the proposed Project. Potential adverse physical effects of the proposed Project are summarized below.

Aesthetics

The existing aesthetic quality of the proposed Project area is dominated by rural agriculture. The proposed Project would alter the visual character of the project sites and their surroundings by converting agricultural land uses to recharge basins and conveyance facilities. The recharge basins would be managed to allow agricultural land uses to continue, such as annual farming or grazing. The EIR will evaluate the potential for the proposed Project to adversely affect aesthetic resources, including visual character and quality, scenic vistas, and new sources of light and glare.

Agriculture and Forestry Resources

The proposed Project would increase the amount and reliability of groundwater supplies available for irrigated agriculture in the region and contribute beneficially to agricultural production. When not being used for groundwater recharge, the proposed recharge facilities could be managed to allow agricultural land uses to continue, such as annual farming or grazing. The EIR will assess whether the proposed Project would adversely affect agriculture and forestry resources, including determining whether the proposed Project would be located on lands designated by the state's Farmland Mapping and Monitoring Program as Prime, Unique, or Important Farmland and if the

Project sites would be located within Kern County agricultural preserves or under Williamson Act contracts. The proposed Project is not located in a forest and would not affect forestry resources.

Air Quality

Construction of the proposed Project would generate emissions from construction equipment exhaust, earth movement, construction workers' commute, and material hauling. The EIR will estimate construction-related emissions as well as long-term operational emissions of the proposed Project. The EIR will also evaluate the proposed Project's consistency with the regional air quality attainment plans. The EIR will develop mitigation measures, if necessary, to reduce impacts associated with the Project.

Biological Resources

The proposed Project would be located on and surrounded by agricultural lands. The EIR will evaluate the potential for the proposed Project to affect biological resources, such as sensitive species and critical habitats, and will evaluate the project's consistency with the Metropolitan Bakersfield Habitat Conservation Plan (HCP), Kern Water Bank HCP, local ordinances, and state and federal regulations governing biological resources. The EIR will also describe how proposed Project operations could provide benefits to threatened and endangered fish species in the Delta, as well as benefits to wetland habitat and wildlife in the Kern Fan area.

Cultural Resources

Although the proposed Project would be located in disturbed areas primarily developed or used for agricultural production, excavation below the top soil for recharge, recovery, or conveyance facilities could uncover previously unknown archaeological resources. Historic resources also exist in the area and may be affected by the proposed Project. The EIR will assess the potential effects of the proposed Project on cultural resources.

Energy

Construction and operation of the proposed Project would result in the consumption of energy resources. The EIR will identify potential effects to local and regional energy supplies and capacity due to construction involving fuels and operation of recovery wells, pumps, and other related infrastructure, which would require energy.

Geology and Soils

The proposed Project is located in a seismically active region. New facilities could be subject to potential seismic hazards including ground shaking. In addition, ground-disturbing construction activities could expose soils to storm water erosion and could uncover previously unknown paleontological resources. The EIR will evaluate geologic hazards and identify known paleontological resources in the region.

Greenhouse Gas Emissions

Construction activities would require operation of equipment and vehicles that emit greenhouse gases (GHGs). The proposed Project facilities would use electric power and potentially other sources of energy, the generation or use of which produces GHGs. The EIR will quantify GHG emissions associated with proposed Project construction and operation in terms of carbon dioxide equivalent (CO2e) emissions and compare Project emissions to regional thresholds of significance. The analysis will consider the collective size of proposed Project facilities with respect to levels of CO2e emissions and the energy efficiency parameters of the proposed Project.

Hazards and Hazardous Materials

Construction of proposed Project facilities would require excavation of the existing ground surface, which could uncover contaminated soils or hazardous substances that pose a substantial hazard to human health or the environment. The EIR will assess the potential for encountering hazardous materials and conditions. The EIR also will assess the potential for the public or the environment to be affected by accidental release of hazardous materials due to proposed Project construction and operation. Groundwater recharge and recovery operations could mobilize existing soil contamination known to exist within the region. The EIR will assess the potential for proposed Project operations to affect the location of contamination plumes and groundwater quality.

Hydrology and Water Quality

The EIR will identify surface water and groundwater resources in the vicinity of the proposed Project and will evaluate potential adverse effects from construction and operation of the proposed facilities. The EIR will describe the recharge and storage capacities of the proposed Project and summarize the potential impacts of proposed groundwater recharge operations on groundwater levels and water quality. A calibrated groundwater model will be used to evaluate impacts associated with recharge operations.

The EIR will include a program-level analysis of the effects associated with operation of the proposed recovery facilities. The EIR will describe the site-specific analysis that will be required once the locations for recovery facilities are ultimately determined, as well as the calibrated groundwater model that will be used to perform and evaluate the project-level impacts associated with the recovery operations.

Cumulative effects of operating the proposed Project will include an assessment of incremental effects to groundwater due to coordinated operation of the proposed Project with Rosedale's existing programs and any other neighboring groundwater recharge or recovery facilities. In addition, the EIR also will describe potential effects associated with storm water runoff and will assess whether construction and operation of the proposed Project will meet regulatory requirements affecting storm water and avoid significant adverse effects to receiving waters.

Land Use

The proposed Project would be located in a rural area of Kern County. The EIR will identify the designated land uses and will evaluate consistency of the proposed Project with existing land uses within the Project area.

Mineral Resources

Petroleum resources and oil production facilities are present in the western portion of Kern County. The EIR will assess effects on mineral resources from implementation of the proposed Project.

Noise

Implementation of the proposed Project would include temporary construction work and ongoing Project operations that generate noise and vibration that could affect nearby residents and other sensitive receptors. The EIR will describe the local noise policies and ordinances. The EIR will assess the significance of noise effects, including quantifying potential noise and vibration levels associated with equipment used to construct and operate the proposed Project in comparison to standards and thresholds established in local noise policies and ordinances.

Population and Housing/Growth

The proposed Project does not include the construction of new housing. As such, the proposed Project would not directly induce population growth. Nevertheless, the EIR will analyze the Project's potential to induce indirect population growth due to the recharge, storage and extraction of surface water stored underground.

Public Services

The proposed Project would construct new water facilities for water recharge, storage, recovery and conveyance and is unlikely to affect demand for other public services or to require other new or expanded public facilities. The EIR will assess the potential for the proposed Project to affect police and fire protection services, schools and parks.

Recreation

The EIR will identify existing recreational areas within the Project area and will analyze potential effects to existing local recreational resources.

Transportation

Construction of the proposed Project would temporarily add additional vehicle trips to local transportation corridors, including material haul trips and construction worker commutes. The EIR will evaluate the effect of the proposed Project on traffic and circulation in the vicinity of the Project site and local and regional roadways.

Tribal Cultural Resources

Both Rosedale and IRWD regularly conduct Assembly Bill (AB) 52 consultation with local area tribes, and tribes will be solicited for information about tribal cultural resources that may be affected by the proposed Project. There is a potential for the proposed Project to affect tribal cultural resources during ground-disturbing activities associated with construction of the proposed Project. The EIR will evaluate potential effects to tribal cultural resources and incorporate the results of any AB 52 consultations into the analysis.

Utilities and Service Systems

The EIR will evaluate whether construction and operation of the proposed Project could result in effects to existing public utilities, such as water or sewage treatment, storm water drainage, and solid waste disposal. Construction and operation of the proposed Project could interfere with electricity systems and other linear utilities, which will be analyzed in the EIR. The EIR also will describe any potential effects on storm water drainage systems and solid waste facilities, including regional landfill capacities and availability to accept construction debris.

Wildfire

The EIR will identify that the proposed Project is located within an agricultural area west of Bakersfield, and is not located within a State Responsibility Area that manages fire hazard severity zones.

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # 2020040010

Project Title: Kern Fan Groundwater Storage Project
Lead Agency: Rosedale-Rio Bravo Water Storage District | Contact Person: Eric Averett
Mailing Address: P.O. Box 20820 | Phone: (661) 589-6045
City: Bakersfield, CA | Zip: 93390-0820 | County: Kern

Project Location: County: Kern | City/Nearest Community: Rosedale, CA
Cross Streets: Stockdale Hwy and Enos Lane (Hwy 43) | Zip Code: 93314
Lat. / Long. (degrees, minutes, and seconds): ° 35°21'16" N/ 119°15'8" W | Total Acres: up to 1,280
Assessor's Parcel No.: | Section: | Twp.: | Range: | Base:
Within 2 Miles: State Hwy #: I-5, 43, 58, 119, 99, 65 | Waterways: Kern River, Rosedale West Intake Canal, Central Intake Canal, Cross Valley Canal, Goose Lake Slough, California Aqueduct | Airports | Railways: San Joaquin Valley Railroad
Schools: Rio Bravo Elementary, Greeley School, Centennial Elementary, Del Rio Elementary

Document Type:

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ☐ Other
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other

Governor's Office of Planning & Research
APR 08 2020
STATE CLEARINGHOUSE after 12p

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other : Easement

Development Type:

☐ Residential: Units | Acres
☐ Office: Sq.ft. | Acres | Employees
☐ Commercial: Sq.ft. | Acres | Employees
☐ Industrial: Sq.ft. | Acres | Employees 0
☐ Educational
☐ Recreational
☒ Water Facilities: Type Conveyance, recharge, and recovery | MGD TBD | ☐ Other:
☐ Transportation: Type
☐ Mining: Mineral
☐ Power: Type | MW
☐ Waste Treatment: Type | MGD
☐ Hazardous Waste: Type

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☒ Agricultural Land ☒ Air Quality ☒ Archeological/Historical ☒ Biological Resources ☐ Coastal Zone ☒ Drainage/Absorption ☐ Economic/Jobs
☐ Fiscal ☒ Flood Plain/Flooding ☒ Forest Land/Fire Hazard ☒ Geologic/Seismic ☒ Minerals ☒ Noise ☒ Population/Housing Balance ☒ Public Services/Facilities
☒ Recreation/Parks ☒ Schools/Universities ☐ Septic Systems ☐ Sewer Capacity ☒ Soil Erosion/Compaction/Grading ☒ Solid Waste ☒ Toxic/Hazardous ☒ Traffic/Circulation
☒ Vegetation ☒ Water Quality ☒ Water Supply/Groundwater ☒ Wetland/Riparian ☒ Growth Inducement ☒ Land Use ☒ Cumulative Effects ☐ Other:
☒ Other Energy, Greenhouse Gas Emissions

Present Land Use/Zoning/General Plan Designation:

Various

Project Description: *(please use a separate page if necessary)*

This Notice of Preparation (NOP) initiates California Environmental Quality Act (CEQA) review for the Kern Fan Groundwater Storage Project ("proposed Project") that Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) propose to jointly carry out through the Groundwater Banking Joint Powers Authority (Authority). Pursuant to CEQA Guidelines section 15051(d), until the Authority is formed, Rosedale will serve as the Lead Agency under CEQA for the preparation of an Environmental Impact Report (EIR). Rosedale and IRWD have agreed that Rosedale will perform the lead agency role until the Authority is formed, and the Authority will assume the role thereafter. In addition, the

EIR will be prepared in accordance with the CEQA-Plus requirements of the U.S. Environmental Protection Agency, to fulfill the requirement of potential federal funding partners to comply with the National Environmental Policy Act (NEPA).

The proposed Project would allow Rosedale and IRWD to more effectively manage sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County, California. The proposed Project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial (M&I) uses. The proposed Project would involve the construction and operation of water conveyance, recharge and recovery facilities.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

____	Air Resources Board	____	Office of Historic Preservation
____	Boating & Waterways, Department of	____	Office of Public School Construction
____	California Emergency Management Agency	____	Parks & Recreation, Department of
____	California Highway Patrol	____	Pesticide Regulation, Department of
____	Caltrans District # 7	____	Public Utilities Commission
____	Caltrans Division of Aeronautics	____	Regional WQCB # 5
____	Caltrans Planning	____	Resources Agency
____	Central Valley Flood Protection Board	____	Resources Recycling and Recovery, Department of
____	Coachella Valley Mountains Conservancy	____	S.F. Bay Conservation & Development Commission
____	Coastal Commission	____	San Gabriel & Lower L.A. Rivers and Mtns Conservancy
____	Colorado River Board	____	San Joaquin River Conservancy
S	Conservation, Department of	____	Santa Monica Mountains Conservancy
____	Corrections, Department of	____	State Lands Commission
____	Delta Protection Commission	____	SWRCB: Clean Water Grants
____	Education, Department of	____	SWRCB: Water Quality
____	Energy Commission	____	SWRCB: Water Rights
S	Fish & Wildlife Region # 4- Central Region	____	Tahoe Regional Planning Agency
____	Food & Agriculture, Department of	____	Toxic Substances Control, Department of
____	Forestry and Fire Protection, Department of	S	Water Resources, Department of
____	General Services, Department of		
____	Health Services, Department of	____	Other _____
____	Housing & Community Development	____	Other _____
____	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date April 8, 2020 Ending Date May 8, 2020

Lead Agency (Complete if applicable):

Consulting Firm: Environmental Science Associates
Address: 626 Wilshire Boulevard Suite 1100
City/State/Zip: Los Angeles, CA 90017
Contact: Jennifer Jacobus
Phone: (213) 599-4320

Applicant: Rosedale-Rio Bravo Water Storage District
Address: 849 Allen Road
City/State/Zip: Bakersfield, CA 93314
Phone: (661) 589-6045

Signature of Lead Agency Representative: Jennifer Jacobus **Date:** 4/7/2020

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

DOC# 4364700

PROOF OF PUBLICATION

The BAKERSFIELD CALIFORNIAN
3700 PEGASUS DRIVE
BAKERSFIELD, CA 93308

ESA / Water
626 WILSHIRE BOULEVARD SUITE 1100
LOS ANGELES, CA 90017

Ad Number:	14713155	**PO #:**	
Edition:	CALC	**Run Times**	1
Class Code	Legal Notices		
Start Date	4/10/2020	**Stop Date**	4/10/2020
Billing Lines	56	**Inches**	336.95
Total Cost	$ 509.54	**Account**	73491279
Billing Address	ESA / Water 626 WILSHIRE BOULEVARDSUITE 1100 LOS ANGELES,CA 90017		

STATE OF CALIFORNIA
COUNTY OF KERN

I AM A CITIZEN OF THE UNITED STATES AND A RESIDENT OF THE COUNTY AFORESAID: I AM OVER THE AGE OF EIGHTEEN YEARS, AND NOT A PARTY TO OR INTERESTED IN THE ABOVE ENTITLED MATTER. I AM THE ASSISTANT PRINCIPAL CLERK OF THE PRINTER OF THE BAKERSFIELD CALIFORNIAN, A NEWSPAPER OF GENERAL CIRCULATION. PRINTED AND PUBLISHED DAILY IN THE CITY OF BAKERSFIELD COUNTY OF KERN,

AND WHICH NEWSPAPER HAS BEEN ADJUDGED A NEWSPAPER OF GENERAL CIRCULATION BY THE SUPERIOR COURT OF THE COUNTY OF KERN, STATE OF CALIFORNIA, UNDER DATE OF FEBRUARY 5, 1952, CASE NUMBER 57610; THAT THE NOTICE, OF WHICH THE ANNEXED IS A PRINTED COPY, HAS BEEN PUBLISHED IN EACH REGULAR AND ENTIRE ISSUE OF SAID NEWSPAPER
AND NOT IN ANY SUPPLEMENT THEREOF ON THE FOLLOWING DATES, TO WIT: 4/10/20

ALL IN YEAR 2020

I CERTIFY (OR DECLARE) UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT.

DATED AT BAKERSFIELD CALIFORNIA

4-10-2020

Solicitor I.D.: 0

First Text
Notice of Preparation of an Environmenta

Ad Number 14713155

Notice of Preparation of an Environmental Impact Report
for the Kern Fan Groundwater Storage Project

A Notice of Preparation (NOP) has been prepared to notify agencies and interested parties about the initiation of a California Environmental Quality Act (CEQA) review for the Kern Fan Groundwater Storage Project ("proposed Project") that Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) will jointly carry out through the Groundwater Banking Joint Powers Authority (Authority). Pursuant to CEQA Guidelines section 15051(d), Rosedale will serve as the Lead Agency for the preparation of an Environmental Impact Report (EIR) until the Authority is formed. Rosedale and IRWD have agreed that Rosedale will perform the lead agency role until the Authority is formed, and the Authority will assume the role thereafter. In addition, the EIR will be prepared in accordance with the CEQA-Plus requirements of the U.S. Environmental Protection Agency, to fulfill the requirement of potential federal funding partners to comply with the National Environmental Policy Act (NEPA).

The proposed Project would allow Rosedale and IRWD to more effectively manage sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop a water bank and associated water conveyance facilities in the Kern Fan area of Kern County, California. The proposed Project would recharge, store, recover, and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and provide supply reliability for agricultural, municipal and industrial uses. The proposed Project would include construction and operation of water conveyance water recharge and recovery facilities. Up to 1,300 acres of land would be acquired for the proposed Project within or near Rosedale's service area in western Kern County for the construction and operation of the proposed Project. The proposed Project would also involve the acquisition of easements for construction, operation and maintenance of the new Kern Fan Conveyance Facilities that would deliver water to and from the California Aqueduct.

Rosedale is soliciting comments from responsible and trustee agencies as well as interested parties as to the scope and content of the environmental information to be included in the EIR. In accordance with CEQA, agencies are requested to review the proposed Project description provided in the NOP and to provide comments on environmental issues related to the statutory responsibilities of each responsible or trustee agency. The EIR may be used by Rosedale, IRWD and the Authority when considering approval of the proposed Project as well as any related discretionary approvals.

The NOP is available online at the Rosedale website (https://www.rrbwsd.com/newsletter-notices) and the IRWD website (https://www.irwd.com/doing-business/environmental-documents). Please mail your comments to Eric Averett, General Manager, Rosedale-Rio Bravo Water Storage District, P.O. Box 20820, Bakersfield CA 93390-0820, by 4:00 p.m. on May 8, 2020. Please include a return address and contact name with your comments. Comments may also be emailed to: eaverett@rrbwsd.com

One public meeting will be conducted virtually utilizing Zoom and telephonically to receive comments and suggestions concerning the issues to be included in the EIR. The scoping meeting will include a brief presentation, providing an overview of the proposed Project. After the virtual presentation, public comments will be accepted orally. The scoping meeting will be held on April 29, 2020 at 9:00 AM. Interested parties can join online at https://zoom.us/join , or dial in to (669) 900-6833, and use the meeting I.D. (646 423 721) and password (447 319).

April 10, 2020
14713155

The Orange County Register
2190 S. Towne Centre Place Suite 100
Anaheim, CA 92806
714-796-2209

5267139

ESA - ENVIRONMENTAL SCIENCE ASSOCIATES
626 WILSHIRE BOULEVARD, SUITE 1100
LOS ANGELES, CA 90017

AFFIDAVIT OF PUBLICATION

STATE OF CALIFORNIA, } **SS.**

County of Orange

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of The Orange County Register, a newspaper of general circulation, published in the city of Santa Ana, County of Orange, and which newspaper has been adjudged to be a newspaper of general circulation by the Superior Court of the County of Orange, State of California, under the date of November 19, 1905, Case No. A-21046, that the notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

04/09/2020

I certify (or declare) under the penalty of perjury under the laws of the State of California that the foregoing is true and correct:

Executed at Anaheim, Orange County, California, on Date: April 09, 2020.

Signature

PROOF OF PUBLICATION

Legal No. **0011378148**

Notice of Preparation of an Environmental Impact Report for the Kern Fan Groundwater Storage Project

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Rosedale is soliciting comments from responsible and trustee agencies as well as interested parties as to the scope and content of the environmental information to be included in the EIR. In accordance with CEQA, agencies are requested to review the proposed Project description provided in the NOP and to provide comments on environmental issues related to the statutory responsibilities of each responsible or trustee agency. The EIR may be used by Rosedale, IRWD and the Authority when considering approval of the proposed Project as well as any related discretionary approvals.

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Published OC Register 9, 2020 11378148

KERN FAN GROUNDWATER STORAGE PROJECT

COMMENT LETTERS RECEIVED DURING PUBLIC SCOPING PERIOD

APRIL 8 TO MAY 8, 2020

Date	Commenting Party
April 9, 2020	Native American Heritage Commission
April 24, 2020	Dudley Ridge Water District
April 27, 2020	Department of Toxic Substance Control
May 7, 2020	California Department of Fish and Wildlife
May 8, 2020	City of Bakersfield
May 8, 2020	Kern County Water Agency
May 8, 2020	California Department of Water Resources
May 8, 2020	Kern Water Bank Authority

STATE OF CALIFORNIA Gavin Newsom, *Governor*

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
Merri Lopez-Keifer
Luiseño

PARLIAMENTARIAN
Russell Attebery
Karuk

COMMISSIONER
Marshall McKay
Wintun

COMMISSIONER
William Mungary
Paiute/White Mountain Apache

COMMISSIONER
Joseph Myers
Pomo

COMMISSIONER
Julie Tumamait-Stenslie
Chumash

COMMISSIONER
[Vacant]

EXECUTIVE SECRETARY
Christina Snider
Pomo

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

April 9, 2020

Eric Averett
Rosedale-Rio Bravo Water Storage District
P.O. Box 20820
Bakersfield, CA 93390-0820

Re: 2020049019, Kern Fan Groundwater Storage Project, Kern County

Dear Mr. Averett:

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

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. Mandatory Topics of Consultation If Requested by a Tribe: 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. Discretionary Topics of Consultation: 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. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: 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. Conclusion of Consultation: 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. 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: 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_CalEPAPDF.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. Tribal Consultation: 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. Confidentiality: 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: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez-Lopez
Staff Services Analyst

cc: State Clearinghouse

Jennifer Jacobus

From: Paul Weghorst <Weghorst@irwd.com>
Sent: Monday, April 27, 2020 7:26 AM
To: Jo Ann Corey
Cc: Fiona Sanchez; Jennifer Jacobus; Kellie Welch
Subject: Fw: Dudley Ridge Comments on NOP for Kern Fan Project EIR

Jo Ann,

Please ensure that the following comments on the Kern Fan Project NOP are considered as official comments from Dudley Ridge Water District.

Thanks,

Paul

From: Dale Melville <dmelville@ppeng.com>
Sent: Friday, April 24, 2020 4:32 PM
To: Paul Weghorst <Weghorst@irwd.com>
Cc: Paul Cook <Cook@irwd.com>; Fiona Sanchez <Sanchezf@irwd.com>; Eric Averett <eaverett@rrbwsd.com>
Subject: RE: Dudley Ridge Comments on NOP for Kern Fan Project EIR

Paul W,
Thx for taking the time to put our discussion into formal comments. I made a few edits to your draft; the comments as shown below can be considered DRWD's comments on the NOP. I'll miss the virtual scoping meeting next week due to another conflict, so our conversation this morning was quite helpful.

Enjoy the weekend and stay safe.

Dale Melville
559-355-5880 cell

From: Paul Weghorst <Weghorst@irwd.com>
Sent: Friday, April 24, 2020 3:45 PM
To: Dale Melville <dmelville@ppeng.com>
Cc: Paul Cook <Cook@irwd.com>; Fiona Sanchez <Sanchezf@irwd.com>; Eric Averett <eaverett@rrbwsd.com>
Subject: Dudley Ridge Comments on NOP for Kern Fan Project EIR

Dale,

It was good talking with you this morning about Dudley Ridge's role in and potential benefits from the Kern Fan Groundwater Storage Project as well as your comments on the Notice of Preparation (NOP) of an EIR for the Project. Following is a summary of the NOP comments that you provided. Let me know if you would like to change or add anything. Otherwise we will include these as Dudley Ridge's comments on the document.

Have a safe weekend,

Paul

General Dudley Ridge Comments:

1) The EIR should evaluate benefits and impacts to Dudley Ridge Water District's water supplies and agricultural lands including any impact of the 1-for-1 exchanges needed to generate ecosystem benefits for the Project. The 1-for-1 exchanges will result in Dudley Ridge Table A water being exchanged for Article 21 water stored in the Ecosystem Account. Since Dudley Ridge is located upstream of the Kern Fan Project on the California Aqueduct, the use of Dudley Ridge's Table A stored in the Kern Fan Project will result in the need for operational exchange capacity and the need to account for groundwater pumping costs--- both impacts need to be evaluated in the EIR.

Specific Dudley Ridge Comments:

1) On pages A-1 and A-2, the section on Rosedale-Rio Bravo Water Storage District describes how the infrastructure for Rosedale's programs includes over 1,000 acres of recharge basins and that infers that these programs provide a maximum annual recharge of more then 250,000 AFY, which implies an ability to recharge 250 feet of water per year. The EIR should clarify the accuracy of these statements by noting the recharge capacity, recovery capacity, and storage volume of each of the various existing programs within Rosedale (i.e., Rosedale, IRWD-Stockdale East/West, IRWD-Strand). The EIR should also provide an overview of the relationship between the proposed Kern Fan Groundwater Storage Project and Rosedale's other programs.

2) On page A-2, the NOP provides a description of the State Water Project (SWP) and the periodic availability of Article 21 water. The environmental analysis contained in the EIR should consider the cumulative impacts on the availability of Article 21 water (as well as Table A water) taking into consideration the pending SWP Water Management Amendment (DEIR comments are due May 13, 2020) and the proposed Delta Conveyance Facility (AIP proposed to be finalized the first of May 2020).

3) On page A-4, the NOP states that up to 25 percent, or up to 25,000 AF, of the unallocated Article 21 water would be stored for DWR in an Ecosystem Account. This statement could be interpreted that anytime Article 21 water is diverted to the Kern Fan Project that up to 25,000 AF of water would be stored in the Ecosystem Account. The EIR should clarify that the Ecosystem Account is limited to a total capacity of 25,000 AF and that once this account in full, that no additional Article 21 water would be delivered into the Ecosystem Account.

4) On page A-4, the NOP states that the remaining 75,000 AF of storage capacity would be divided equally between IRWD and Rosedale. However, the text does not state that Article 21 water would be recharged into these accounts. The EIR should make it clear that 75 percent of the Article 21 water would be recharged into the IRWD and Rosedale accounts until the Ecosystem Account is full and then 100 percent of the Article 21 water would be recharged into the IRWD and Rosedale accounts.

5) On page A-6, the NOP states that the Kern Fan Project would increase the amount and reliability of groundwater supplies available for irrigated agriculture in the region and contribute beneficially to agricultural production. The EIR should clarify the Project would also provide benefits to urban areas of IRWD and Rosedale. This clarification should be consistently applied throughout the EIR.

Department of Toxic Substances Control

Jared Blumenfeld
Secretary for
Environmental Protection

Meredith Williams, Ph.D.
Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Gavin Newsom
Governor

April 27, 2020

Mr. Eric Averett
Rosedale-Rio Bravo Water Storage District
P.O. Box 20820
Bakersfield, California 93390-0820
eaverett@rrbwsd.com

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT FOR KERN FAN GROUNDWATER STORAGE PROJECT – DATED APRIL 8, 2020 (STATE CLEARINGHOUSE NUMBER: 2020049010)

Dear Mr. Averett:

The Department of Toxic Substances Control (DTSC) received a Revised Notice of Preparation of an Environmental Impact Report (EIR) for Kern Fan Groundwater Storage Project. The proposed Project would allow Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to more effectively manage sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County, California. The proposed Project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial (M&I) uses. The proposed Project would involve the construction and operation of water conveyance, recharge and recovery facilities.

DTSC recommends that the following issues be evaluated in the EIR Hazards and Hazardous Materials section:

1. The EIR should acknowledge the potential for historic or future activities on or near the project site to result in the release of hazardous wastes/substances on the project site. In instances in which releases have occurred or may occur, further studies should be carried out to delineate the nature and extent of the contamination, and the potential threat to public health and/or the environment should be evaluated. The EIR should also identify the mechanism(s) to initiate

any required investigation and/or remediation and the government agency who will be responsible for providing appropriate regulatory oversight.

2. Refiners in the United States started adding lead compounds to gasoline in the 1920s in order to boost octane levels and improve engine performance. This practice did not officially end until 1992 when lead was banned as a fuel additive in California. Tailpipe emissions from automobiles using leaded gasoline contained lead and resulted in aerially deposited lead (ADL) being deposited in and along roadways throughout the state. ADL-contaminated soils still exist along roadsides and medians and can also be found underneath some existing road surfaces due to past construction activities. Due to the potential for ADL-contaminated soil DTSC, recommends collecting soil samples for lead analysis prior to performing any intrusive activities for the project described in the EIR.

3. If any sites within the project area or sites located within the vicinity of the project have been used or are suspected of having been used for mining activities, proper investigation for mine waste should be discussed in the EIR. DTSC recommends that any project sites with current and/or former mining operations onsite or in the project site area should be evaluated for mine waste according to DTSC's 1998 Abandoned Mine Land Mines Preliminary Assessment Handbook (https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/11/aml_handbook.pdf).

4. If buildings or other structures are to be demolished on any project sites included in the proposed project, surveys should be conducted for the presence of lead-based paints or products, mercury, asbestos containing materials, and polychlorinated biphenyl caulk. Removal, demolition and disposal of any of the above-mentioned chemicals should be conducted in compliance with California environmental regulations and policies. In addition, sampling near current and/or former buildings should be conducted in accordance with DTSC's 2006 *Interim Guidance Evaluation of School Sites with Potential Contamination from Lead Based Paint, Termiticides, and Electrical Transformers* (https://dtsc.ca.gov/wpcontent/uploads/sites/31/2018/09/Guidance_Lead_Contamination_050118.pdf).

5. If any projects initiated as part of the proposed project require the importation of soil to backfill any excavated areas, proper sampling should be conducted to ensure that the imported soil is free of contamination. DTSC recommends the imported materials be characterized according to *DTSC's 2001 Information Advisory Clean Imported Fill Material* (https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/09/SMP_FS_Cleanfill-Schools.pdf).

6. If any sites included as part of the proposed project have been used for agricultural, weed abatement or related activities, proper investigation for organochlorinated pesticides should be discussed in the EIR. DTSC recommends the current and former agricultural lands be evaluated in accordance with DTSC's 2008 *Interim Guidance for Sampling Agricultural*

Properties (Third Revision) (https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/09/Ag-Guidance-Rev-3-August-7-2008-2.pdf).

DTSC appreciates the opportunity to comment on the project. Should you need any assistance with an environmental investigation, please submit a request for Lead Agency Oversight Application, which can be found at: https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/09/VCP_App-1460.doc. Additional information regarding voluntary agreements with DTSC can be found at: https://dtsc.ca.gov/brownfields/.

If you have any questions, please contact me at (916) 255-3710 or via email at Gavin.McCreary@dtsc.ca.gov.

Sincerely,

Gavin McCreary
Project Manager
Site Evaluation and Remediation Unit
Site Mitigation and Restoration Program
Department of Toxic Substances Control

cc: (via email)

Governor's Office of Planning and Research
State Clearinghouse
State.Clearinghouse@opr.ca.gov

Ms. Lora Jameson, Chief
Site Evaluation and Remediation Unit
Department of Toxic Substances Control
Lora.Jameson@dtsc.ca.gov

Mr. Dave Kereazis
Office of Planning & Environmental Analysis
Department of Toxic Substances Control
Dave.Kereazis@dtsc.ca.gov

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Central Region
1234 East Shaw Avenue
Fresno, California 93710
(559) 243-4005
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

May 7, 2020

Eric Averett, General Manager
Rosedale-Rio Bravo Water Storage District
Post Office Box 20820
Bakersfield, California 93390-0820
eaverett@rrbwsd.com

Subject: Kern Fan Groundwater Storage Project (Project)
Notice of Preparation (NOP)
State Clearinghouse (SCH) No. 2020049019

Dear Mr. Averett:

The California Department of Fish and Wildlife (CDFW) received a NOP for an Environmental Impact Report (EIR) from Rosedale-Rio Bravo Water Storage District (Rosedale) for the Project pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1] Please note that an earlier version of this letter had an incorrect SCH Number and that this letter supersedes the previous version. All other letter content is identical.

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, CDFW appreciates the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a)). CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (*Id.*, § 1802). Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

CDFW is also submitting comments as a **Responsible Agency** under CEQA (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381). CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority (Fish & G. Code, § 1600 et seq.). Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), related authorization as provided by the Fish and Game Code will be required.

CDFW has jurisdiction over fully protected species of birds, mammals, amphibians and reptiles, and fish, pursuant to Fish and Game Code sections 3511, 4700, 5050, and 5515. Take of any fully protected species is prohibited and CDFW cannot authorize their incidental take.

The use of unallocated stream flows are subject to appropriation and approval by the State Water Resources Control Board (SWRCB) pursuant to Water Code section 1225. CDFW, as Trustee Agency, is consulted by the SWRCB during the water rights process to provide terms and conditions designed to protect fish and wildlife prior to appropriation of the State's water resources. Certain fish and wildlife are reliant upon aquatic ecosystems, which in turn are reliant upon adequate flows of water. CDFW therefore has a material interest in assuring that adequate water flows within streams for the protection, maintenance, and proper stewardship of those resources. CDFW provides, as available, biological expertise to review and comment on environmental documents and impacts arising from project activities.

PROJECT DESCRIPTION SUMMARY

Proponent: Rosedale and Irvine Ranch Water District (IRWD) propose to jointly carry out the Project through the Groundwater Banking Joint Powers Authority (Authority). Pursuant to CEQA Guidelines section 15051(d), until the Authority is formed, Rosedale will serve as the Lead Agency under CEQA for the preparation of an EIR. Rosedale and IRWD have agreed that Rosedale will perform the lead agency role until the Authority is formed, and the Authority will assume the role thereafter.

Objective: The objectives of the proposed Project are as follows:

- Capture, recharge, and store water from the State Water Project (SWP) and other available water supplies for later use.

- Provide ecosystem public benefits, emergency water supply public benefits during extended droughts or a Delta levee failure, and water supply benefits for agricultural and for municipal and industrial uses.

- Provide operating flexibility for Rosedale's existing and future conjunctive use programs.

- Assist in achieving groundwater sustainability within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin through implementation of projects consistent with California Executive Order N-10-19 directing state agencies to develop a "water resilience portfolio."

- Provide Rosedale and IRWD customers and partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted.

Project Description: The proposed Project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. The Kern Fan Conveyance Facilities would consist of pipelines, pump stations, and a new turnout at the California Aqueduct to convey water between the project facilities and the California Aqueduct. Water stored by the proposed Project would be recovered when needed to provide ecosystem and water supply benefits.

The proposed Project would be operated such that surplus surface water from the SWP and other available water sources would be recharged and stored for subsequent recovery. It is estimated that the Project would be able to recharge and store approximately 100,000 acre-feet per year (AFY). Project capacities are to be allocated as follows:

Up to 25 percent, or up to 25,000 acre-feet (AF), of the "unallocated" SWP Article 21 water would be stored for the California Department of Water Resources (DWR) in an "Ecosystem Account." Through the implementation of 1-for-1 exchanges, the water stored in the Ecosystem Account would be used by the State of California to alleviate stress on endangered and threatened species in the Sacramento-San Joaquin River Delta during critically dry years.

The remaining 75,000 AF of storage capacity would be divided equally, with 37,500 AF of storage capacity allocated to Rosedale and 37,500 AF of storage capacity allocated to IRWD. Rosedale and IRWD would use the water recharged in their respective accounts for agriculture, municipal, and industrial uses, improving water supply reliability during droughts and emergencies.

The proposed Project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the Project area. Water could be conveyed to and from Phase 1 and 2 properties through existing facilities and a new turnout and conveyance system (Kem Fan Conveyance Facilities) connecting to the California Aqueduct. Project operations would be coordinated with Rosedale's Conjunctive Use Program.

Recharge Facilities

The proposed Project would include the construction of recharge basins of varying shape, size, and depth within approximately 1,300 acres. Basins would be formed by excavating and contouring existing soils to form earthen berms. Typical basin berms would be approximately three to six feet above ground.

Dirt roads approximately 14 to 20 feet wide would run along the perimeter of and in between all basins to provide access to facilities during operation and maintenance activities. Surface water would be delivered to the basins for recharge through the new Kem Fan Conveyance Facilities, and the basins would be connected by check structures to allow recharge water to flow by gravity among basins. The basins would be managed to allow agricultural land uses (e.g., annual farming or grazing) to continue when the basins are empty.

Recharge Water Supplies

The proposed Project would receive, recharge, and store SWP Article 21 water, which is a surplus supply managed by DWR. Other water supplies also may be secured and acquired by Rosedale and IRWD from various sources, and may include federal, state, and local supplies through transfers, balanced and unbalanced water exchange agreements, water purchases or temporary transfers, or other available means. Sources may also include supplies from the Central Valley Project, and high-flow Kem River water depending on annual hydrologic availability, water rights, and regulatory considerations.

Recovery Facilities

The proposed Project would construct up to 12 extraction wells, with an anticipated annual recovery capacity of up to 50,000 AF. Each well would be designed to pump groundwater at a recovery rate of approximately five to six cubic feet per second (cfs). Actual recovery rates for each well may be slightly more or less based on aquifer conditions at each well site. If higher production is achieved for the first few wells installed, fewer wells may be needed. Additionally, if any agricultural wells exist on the recharge basin sites, these could potentially be used as production wells or monitoring wells. The proposed recovery facilities would be designed and located to minimize potential effects on wells pumping on adjacent properties.

Conveyance Facilities

The proposed Project includes a new turnout, additional canals and pipelines, and pump stations (collectively the "Kem Fan Conveyance Facilities") to convey water to and from the California Aqueduct and proposed recharge and recovery facilities. The

exact locations of the new conveyance facilities have not yet been determined but would have up to 500 cfs of conveyance capacity. Subject to necessary approvals, water could be conveyed through the SWP, Friant-Kern Canal, or the Kern River by exchange through the Goose Lake Channel, or from the Cross Valley Canal (CVC) through the Rosedale Intake Canal.

Groundwater recovered from the Project extraction wells would be conveyed through new pipelines that would be below ground, running along the dirt roads between the recharge basins, or buried in the basin bottoms, with exact locations subject to final well placement. The recovery pipelines would connect to the new Kern Fan Conveyance Facilities or could connect to the CVC via existing conveyance facilities.

Location: The proposed Project boundary would be located within the Rosedale district boundary in western Kem County, west of the City of Bakersfield. The proposed recharge and recovery facilities would be constructed in two phases on approximately 1,300 acres of agricultural or vacant land within or near the Rosedale service area.

Timeframe: Unspecified

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist Rosedale in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. Editorial comments or other suggestions may also be included to improve the CEQA document.

Aerial imagery of the Project boundary and its surroundings within the Rosedale District boundary show the Goose Lake and Kern River riparian corridors, riparian-lined canal corridors, large trees, Great Valley cottonwood riparian forest, Great Valley mesquite scrub, Valley salt bush scrub, upland grassland, and agricultural habitats. Based on a review of the Project description, a review of California Natural Diversity Database (CNDDB) records, and the surrounding habitat, several special-status species could potentially be impacted by Project activities.

Project-related construction activities within the Project boundary including but not limited to construction and operation of additional water banking facilities and introduction of surface water flows for storage could impact the following special-status plant and wildlife species and habitats known to occur in the area: the State threatened and federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*), the State and federally endangered Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), the State and federally endangered and State fully protected blunt-nosed leopard lizard (*Gambelia sila*), the State threatened Swainson's hawk (*Buteo swainsoni*), Nelson's

antelope squirrel (*Ammospermophilus nelsoni*), and tricolored blackbird (*Agelaius tricolor*), the federally endangered and California rare plant rank (CRPR) 1B.2 San Joaquin woollythreads (*Monolopia congdonii*), the federally endangered and CRPR1B.2 Kern mallow (*Eremalche parryi* ssp*. kernensis*), the CRPR 4.2 Hoover's eriastrum (*Eriastrum hooveri*), the CRPR 1B.2 recurved larkspur (*Delphinium recurvatum*) and Munz's tidy-tips (*Layia munzii*), the CRPR 1B.1 Mason's neststraw (Stylocline masonii), and the State species of special concern American badger (*Taxidea taxus*), Tulare grasshopper mouse (*Onychomys torridus tularensis*), burrowing owl (*Athene cunicularia*), San Joaquin coachwhip (*Masticophis flagellum ruddocki*), California glossy snake (*Arizona elegans occidentalis*), western spadefoot (*Spea hammondi*), and coast horned lizard (*Phrynosoma blainvillii*).

Please note that the CNDDB is populated by and records voluntary submissions of species detections. As a result, species may be present in locations not depicted in the CNDDB but where there is suitable habitat and features capable of supporting species. Therefore, a lack of an occurrence record in the CNDDB is not tantamount to a negative species finding. In order to adequately assess any potential Project related impacts to biological resources, surveys conducted by a qualified wildlife biologist/botanist during the appropriate survey period(s) and using the appropriate protocol survey methodology are warranted in order to determine whether or not any special-status species are present at or near the Project area.

CDFW recommends that the following modifications and/or edits be incorporated into the EIR.

I. Mitigation Measure or Alternative and Related Impact Shortcoming

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 CDFW or the United States Fish and Wildlife Service (USFWS)?

COMMENT 1: San Joaquin Kit Fox (SJKF)

Issue: SJKF occurrences have been documented within the Project boundary (CDFW 2020a). The Project has the potential to temporarily disturb and permanently alter suitable habitat for SJKF and directly impact individuals if present during construction, recharge, and other activities.

SJKF den in a variety of areas such as right-of-ways, agricultural and fallow/ruderal habitat, dry stream channels, and canal levees, and populations can fluctuate over time. SJKF are also capable of occupying urban environments (Cypher and Frost 1999). SJKF may be attracted to Project areas due to the type and level of

ground-disturbing activities and the loose, friable soils resulting from intensive ground disturbance. SJKF will forage in fallow and agricultural fields and utilize streams and canals as dispersal corridors. As a result, there is potential for SJKF to occupy all suitable habitat within the Rosedale boundary and surrounding area.

Specific impact: Without appropriate avoidance and minimization measures for SJKF, potential significant impacts associated with construction include habitat loss, den collapse, inadvertent entrapment, reduced reproductive success, reduction in health and vigor of young, and direct mortality of individuals.

Evidence impact is potentially significant: Habitat loss resulting from land conversion to agricultural, urban, and industrial development is the primary threat to SJKF (Cypher et al. 2013). Western Kern County supports relatively large areas of high suitability habitat and one of the largest remaining populations of SJKF (Cypher et al. 2013). The Project area is within this remaining highly suitable habitat, which is otherwise intensively managed for agriculture. Therefore, subsequent ground-disturbing activities have the potential to significantly impact local SJKF populations.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to SJKF associated with subsequent land conversion, ground disturbance and construction, CDFW recommends conducting the following evaluation of project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 1: SJKF Habitat Assessment

For all Project-specific components including construction and land conversion, CDFW recommends that a qualified biologist conduct a habitat assessment in advance of Project implementation, to determine if the Project area or its immediate vicinity contains suitable habitat for SJKF.

Recommended Mitigation Measure 2: SJKF Surveys

CDFW recommends assessing presence/absence of SJKF by having qualified biologists conducting surveys of Project areas and a 500-foot buffer of Project areas to detect SJKF and their sign. CDFW also recommends following the USFWS "Standardized recommendations for protection of the San Joaquin kit fox prior to or during ground disturbance" (2011).

Recommended Mitigation Measure 3: SJKF Take Authorization

SJKF detection warrants consultation with CDFW to discuss how to avoid take or, if avoidance is not feasible, to acquire an Incidental Take Permit (ITP) prior to ground-disturbing activities, pursuant to Fish and Game Code section 2081(b).

COMMENT 2: Blunt-nosed Leopard Lizard (BNLL)

Issue: BNLL have been documented in suitable habitat within and adjacent to the Project boundary (CDFW 2020a). Suitable BNLL habitat includes areas of grassland and upland scrub that contain requisite habitat elements, such as small mammal burrows. BNLL also use open space patches between suitable habitats, including disturbed sites, unpaved access roadways, and canals.

Specific impact: Without appropriate avoidance and minimization measures for BNLL, potentially significant impacts associated with ground-disturbing activities include habitat loss, burrow collapse, reduced reproductive success, reduced health and vigor of eggs and/or young, and direct mortality.

Evidence impact is potentially significant: Habitat loss resulting from agricultural, urban, and industrial development is the primary threat to BNLL (ESRP 2020a). The range for BNLL now consists of scattered parcels of undeveloped land within the valley floor and the foothills of the Coast Range (USFWS 1998). Some undeveloped areas with suitable BNLL habitat occur within the Project and surrounding area; therefore, ground disturbance and conversion of suitable habitat has the potential to significantly impact local BNLL populations.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to BNLL associated with subsequent development, CDFW recommends conducting the following evaluation of Project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 4: BNLL Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment in advance of project implementation, to determine if the Project area or its immediate vicinity contains suitable habitat for BNLL.

Recommended Mitigation Measure 5: BNLL Surveys

If suitable habitat is present, prior to initiating any vegetation- or ground-disturbance activities, CDFW recommends conducting surveys in accordance with the “Approved Survey Methodology for the Blunt-nosed Leopard Lizard” (CDFG 2019). This survey

protocol, designed to optimize BNLL detectability, reasonably assures CDFW that ground disturbance will not result in take of this fully protected species.

CDFW advises that BNLL surveys be completed no more than one year prior to initiation of ground disturbance. Please note that protocol-level surveys must be conducted on multiple dates during late spring, summer, and fall of the same calendar year, and that within these time periods, there are specific protocol-level date, temperature, and time parameters that must be adhered to. As a result, protocol-level surveys for BNLL are not synonymous with 30-day "preconstruction surveys" often recommended for other wildlife species. In addition, the BNLL protocol specifies different survey effort requirements based on whether the disturbance results from maintenance activities or if the disturbance results in habitat removal (CDFG 2019).

Recommended Mitigation Measure 6: BNLL Take Avoidance

BNLL detection during protocol-level surveys warrants consultation with CDFW to discuss whether take of BNLL can be avoided during ground-disturbing Project activities.

COMMENT 3: San Joaquin Antelope Squirrel (SJAS)

Issue: SJAS have been documented to occur within areas of suitable habitat within the Project vicinity (CDFW 2020a). Suitable SJAS habitat includes areas of grassland, upland scrub, and alkali sink habitats that contain requisite habitat elements, such as small mammal burrows.

Specific impact: Without appropriate avoidance and minimization measures for SJAS, potential significant impacts include loss of habitat, burrow collapse, inadvertent entrapment of individuals, reduced reproductive success such as reduced health or vigor of young, and direct mortality of individuals.

Evidence impact is potentially significant: Habitat loss resulting from agricultural, urban, and industrial development is the primary threat to SJAS. Very little suitable habitat for this species remains along the western floor of the San Joaquin Valley (ESRP 2020b). Areas of suitable habitat within the Project represent some of the only remaining undeveloped land in the vicinity, which is otherwise intensively managed for agriculture. As a result, ground-disturbing activities within the Project may have the potential to significantly impact local populations of SJAS.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to SJAS associated with subsequent development, CDFW recommends conducting the following evaluation of Project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 7: SJAS Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment in advance of project implementation, to determine if the Project area or its immediate vicinity contains suitable habitat for SJAS.

Recommended Mitigation Measure 8: SJAS Surveys

In areas of suitable habitat, CDFW recommends that a qualified biologist conduct focused daytime visual surveys for SJAS using line transects with 10- to 30-meter spacing of Project areas and a 50-foot buffer around those areas. CDFW further advises that these surveys be conducted between April 1 and September 20, during daytime temperatures between 68° and 86° F (CDFG 1990), to maximize detectability.

Recommended Mitigation Measure 9: SJAS Avoidance

If suitable habitat is present and surveys are not feasible, CDFW advises maintenance of a 50-foot minimum no-disturbance buffer around all small mammal burrow entrances until the completion of Project activities.

Recommended Mitigation Measure 10: SJAS Take Authorization

SJAS detection warrants consultation with CDFW to discuss how to avoid take or, if avoidance is not feasible, to acquire a State ITP prior to ground-disturbing activities, pursuant to Fish and Game Code section 2081(b).

COMMENT 4: Tipton Kangaroo Rat (TKR)

Issue: TKR have been documented to occur within areas of suitable habitat within and adjacent to the Project (CDFW 2020a). Suitable TKR habitat includes areas of grassland, upland scrub, and alkali sink habitats that contain requisite habitat elements, such as small mammal burrows.

Specific impact: Without appropriate avoidance and minimization measures for TKR, potential significant impacts include loss of habitat, burrow collapse, inadvertent entrapment of individuals, reduced reproductive success such as reduced health or vigor of young, and direct mortality of individuals.

Evidence impact is potentially significant: Habitat loss resulting from agricultural, urban, and industrial development is the primary threat to TKR. Very little suitable habitat for this species remains along the western floor of the San Joaquin Valley (ESRP 2020c). Areas of suitable habitat within the Project represent some of the only remaining undeveloped land in the vicinity, which is otherwise intensively managed for agriculture. As a result, ground-disturbing activities within the Project may have the potential to significantly impact local populations of TKR.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to TKR associated with subsequent development, CDFW recommends conducting the following evaluation of Project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 11: TKR Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment in advance of Project implementation, to determine if the Project area or its immediate vicinity contains suitable habitat for TKR.

Recommended Mitigation Measure 12: TKR Avoidance

If suitable habitat is present, CDFW advises maintenance of a 50-foot minimum no-disturbance buffer around all small mammal burrow entrances of suitable size for TKR use.

Recommended Mitigation Measure 13: TKR Surveys

If burrow avoidance is not feasible, CDFW recommends that focused protocol-level trapping surveys be conducted by a qualified wildlife biologist that is permitted to do so by both CDFW and USFWS, to determine if TKR occurs in the Project area. CDFW advises that these surveys be conducted in accordance with the USFWS (2013) "Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats," well in advance of ground-disturbing activities in order to determine whether impacts to TKR could occur.

Recommended Mitigation Measure 14: TKR Take Authorization

TKR detection warrants consultation with CDFW to discuss how to avoid take or, if avoidance is not feasible, to acquire an ITP prior to ground-disturbing activities, pursuant to Fish and Game Code section 2081(b).

COMMENT 5: Swainson's Hawk (SWHA)

Issue: SWHA have been documented within the Project area. Review of recent aerial imagery indicates that trees capable of supporting nesting SWHA occur along the Kern River, and within the Project and overall Rosedale boundary. Landscape trees may also provide suitable nesting habitat. In addition, grassland and agricultural land in the surrounding area provide suitable foraging habitat for SWHA, increasing the likelihood of SWHA occurrence within the vicinity.

Specific impact: Without appropriate avoidance and minimization measures for SWHA, potential significant impacts associated with Project activities include loss of forging and/or nesting habitat, nest abandonment, reduced reproductive success, and reduced health and vigor of eggs and/or young.

Evidence impact would be significant: Lack of suitable nesting habitat in the San Joaquin Valley limits the local distribution and abundance of SWHA (CDFW 2016). The trees within the Project represent some of the only remaining suitable nesting habitat in the local vicinity. Depending on the timing of construction, activities including noise, vibration, and movement of workers or equipment could affect nests and have the potential to result in nest abandonment, significantly impacting local nesting SWHA. In addition, agricultural cropping patterns can directly influence distribution and abundance of SWHA. For example, SWHA can forage in grasslands, pasture, hay crops, and low growing irrigated crops; however, other agricultural crops such as orchards and vineyards are incompatible with SWHA foraging (Estep 2009, Swolgaard et al. 2008).

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to SWHA associated with subsequent development, CDFW recommends conducting the following evaluation of Project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 15: Focused SWHA Surveys

To evaluate potential Project-related impacts, CDFW recommends that a qualified wildlife biologist conduct surveys for nesting SWHA following the entire survey methodology developed by the SWHA Technical Advisory Committee (SWHA TAC 2000) prior to Project initiation. SWHA detection during protocol-level surveys warrants consultation with CDFW to discuss how to implement Project activities and avoid take.

Recommended Mitigation Measure 16: SWHA Avoidance

CDFW recommends that if Project-specific activities will take place during the SWHA nesting season (i.e., March 1 through August 31), and active SWHA nests are present, a minimum ½-mile no-disturbance buffer be delineated and maintained around each nest, regardless if when it was detected by surveys or incidentally, until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival, to prevent nest abandonment and other take of SWHA as a result of Project activities.

Recommended Mitigation Measure 17: Tree Removal

CDFW recommends that the removal of known raptor nest trees, even outside of the nesting season, be replaced with an appropriate native tree species planting at a ratio of 3:1 at or near the Project area or in another area that will be protected in perpetuity. This mitigation would offset the local and temporal impacts of nesting habitat loss.

Recommended Mitigation Measure 18: SWHA Take Authorization

If SWHA are detected and a ½-mile no-disturbance nest buffer is not feasible, consultation with CDFW is warranted to determine if the Project can avoid take. If SWHA take cannot be avoided, issuance of an ITP prior to Project activities is warranted to comply with CESA

COMMENT 6: Tricolored Blackbird (TRBL)

Issue: TRBL are known to occur in the Project vicinity (CDFW 2020a, UC Davis 2020). Review of aerial imagery indicates that the Project boundary includes flood-irrigated agricultural land, which is an increasingly important nesting habitat type for TRBL, particularly in the San Joaquin Valley (Meese et al. 2017).

Specific impact: Without appropriate avoidance and minimization measures for TRBL, potential significant impacts associated subsequent development include nesting habitat loss, nest and/or colony abandonment, reduced reproductive success, and reduced health and vigor of eggs and/or young.

Evidence impact would be significant: As mentioned above, flood-irrigated agricultural land is an increasingly important nesting habitat type for TRBL, particularly in the San Joaquin Valley (Meese et al. 2014). This nesting substrate is present within the Project vicinity. TRBL aggregate and nest colonially, forming colonies of up to 100,000 nests (Meese et al. 2014). Approximately 86% of the

global population is found in the San Joaquin Valley (Kelsey 2008, Weintraub et al. 2016). In addition, TRBL have been forming larger colonies that contain progressively larger proportions of the species' total population (Kelsey 2008). In 2008, for example, 55% of the species' global population nested in only two colonies, which were located in silage fields (Kelsey 2008). Nesting can occur synchronously, with all eggs laid within one week (Orians 1961). For these reasons, depending on timing, disturbance to nesting colonies can cause nest entire colony site abandonment and loss of all unfledged nests, significantly impacting TRBL populations (Meese et al. 2014).

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to TRBL associated with subsequent development, CDFW recommends conducting the following evaluation of Project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 19: TRBL Surveys

CDFW recommends that construction be timed to avoid the typical bird-breeding season of February 1 through September 15. If Project activity that could disrupt nesting must take place during that time, CDFW recommends that a qualified wildlife biologist conduct surveys for nesting TRBL no more than 10 days prior to the start of implementation to evaluate presence/absence of TRBL nesting colonies in proximity to Project activities and to evaluate potential Project-related impacts.

Recommended Mitigation Measure 20: TRBL Colony Avoidance

If an active TRBL nesting colony is found during preconstruction surveys, CDFW recommends implementation of a minimum 300-foot no-disturbance buffer, in accordance with CDFW's "Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015" (CDFW 2015), until the breeding season has ended or until a qualified biologist has determined that nesting has ceased and the young have fledged and are no longer reliant upon the colony or parental care for survival. It is important to note that TRBL colonies can expand over time and for this reason, CDFW recommends that an active colony be reassessed to determine its extent within 10 days prior to Project initiation.

Recommended Mitigation Measure 21: TRBL Take Authorization

In the event that a TRBL nesting colony is detected during surveys, consultation with CDFW is warranted to discuss whether the Project can avoid take; if take avoidance is not feasible, to acquire an ITP, pursuant to Fish and Game Code section 2081(b), prior to any Project activities.

COMMENT 7: Special-status Plants

Issue: Special-status plant species meeting the definition of rare or endangered under CEQA section 15380 are known to occur within the Project and surrounding area. San Joaquin woollythreads, Kern mallow, Hoover's eriastrum, Masons neststraw, recurved larkspur, and Munz's tidy-tips have been documented within the Project area and Rosedale boundary.

Specific impact: Without appropriate avoidance and minimization measures for special-status plants, potential significant impacts associated with subsequent construction include loss of habitat, loss or reduction of productivity, and direct mortality.

Evidence impact would be significant: San Joaquin woollythreads, Kern mallow, Hoover's eriastrum, Mason's neststraw, recurved larkspur, Munz's tidy-tips, and many other special-status plant species are threatened by grazing and agricultural, urban, and energy development. Many historical occurrences of these species are presumed extirpated (CNPS 2019). Though new populations have recently been discovered, impacts to existing populations have the potential to significantly impact populations of plant species.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to special-status plants associated with subsequent development, CDFW recommends conducting the following evaluation of Project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 22: Special-Status Plant Surveys

CDFW recommends that individual Project sites be surveyed for special-status plants by a qualified botanist following the "Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities" (CDFG 2018b). This protocol, which is intended to maximize detectability, includes the identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period.

Recommended Mitigation Measure 23: Special-Status Plant Avoidance

CDFW recommends that special-status plant species be avoided whenever possible by delineating and observing a no-disturbance buffer of at least 50 feet from the outer edge of the plant population(s) or specific habitat type(s) required by special-status plant species. If buffers cannot be maintained, then consultation with CDFW may be warranted to determine appropriate minimization and mitigation measures for impacts to special-status plant species.

Recommended Mitigation Measure 24: Listed Plant Species Take Authorization

If a State-listed plant species is identified during botanical surveys, consultation with CDFW is warranted to determine if the Project can avoid take. If take cannot be avoided, take authorization is warranted. Take authorization would occur through issuance of an ITP, pursuant to Fish and Game Code section 2081(b).

COMMENT 8: Burrowing Owl (BUOW)

Issue: BUOW occur within and in the vicinity of the Project (CDFW 2020a). BUOW inhabit open grassland containing small mammal burrows, a requisite habitat feature used by BUOW for nesting and cover. Habitat both within and surrounding the Project supports grassland habitat. Therefore, there is potential for BUOW to occupy or colonize the Project.

Specific impact: Potentially significant direct impacts associated with subsequent activities and land conversion include habitat loss, burrow collapse, inadvertent entrapment, nest abandonment, reduced reproductive success, reduction in health and vigor of eggs and/or young, and direct mortality of individuals.

Evidence impact is potentially significant: BUOW rely on burrow habitat year-round for their survival and reproduction. Habitat loss and degradation are considered the greatest threats to BUOW in California's Central Valley (Gervais et al. 2008). The Project and surrounding area contain remnant undeveloped land but is otherwise intensively managed for agriculture; therefore, subsequent ground-disturbing activities associated with subsequent constructions have the potential to significantly impact local BUOW populations. In addition, and as described in CDFW's "Staff Report on Burrowing Owl Mitigation" (CDFG 2012), excluding and/or evicting BUOW from their burrows is considered a potentially significant impact under CEQA.

Recommended Potentially Feasible Mitigation Measure(s) (Regarding Environmental Setting and Related Impact)
To evaluate potential impacts to BUOW associated with subsequent development, CDFW recommends conducting the following evaluation of Project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 25: BUOW Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment in advance of Project implementation, to determine if the Project area or its vicinity contains suitable habitat for BUOW.

Recommended Mitigation Measure 26: BUOW Surveys

If suitable habitat is present on or in the vicinity of the Project area, CDFW recommends assessing presence/absence of BUOW by having a qualified biologist conduct surveys following the California Burrowing Owl Consortium's "Burrowing Owl Survey Protocol and Mitigation Guidelines" (CBOC 1993) and CDFW's "Staff Report on Burrowing Owl Mitigation" (CDFG 2012). Specifically, CBOC and CDFW's Staff Report suggest three or more surveillance surveys conducted during daylight with each visit occurring at least three weeks apart during the peak breeding season (i.e., April 15 to July 15), when BUOW are most detectable. In addition, CDFW advises that surveys include a minimum 500-foot buffer area around the Project area.

Recommended Mitigation Measure 27: BUOW Avoidance

CDFW recommends that no-disturbance buffers, as outlined in the "Staff Report on Burrowing Owl Mitigation" (CDFG 2012), be implemented prior to and during any ground-disturbing activities. Specifically, CDFW's Staff Report recommends that impacts to occupied burrows be avoided in accordance with the following table unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

* meters (m)

Recommended Mitigation Measure 28: BUOW Passive Relocation and Mitigation

If BUOW are found within these recommended buffers and avoidance is not possible, it is important to note that according to the Staff Report (CDFG 2012), excluding birds from burrows is not a take avoidance, minimization, or mitigation method and is instead considered a potentially significant impact under CEQA. If it is necessary for Project implementation, CDFW recommends that burrow exclusion be conducted by qualified biologists and only during the non-breeding season, before breeding behavior is exhibited and after the burrow is confirmed empty through non-invasive methods, such as surveillance. CDFW recommends

replacement of occupied burrows with artificial burrows at a ratio of one burrow collapsed to one artificial burrow constructed (1:1) to mitigate for evicting BUOW and the loss of burrows. BUOW may attempt to colonize or re-colonize an area that will be impacted; thus, CDFW recommends ongoing surveillance at a rate that is sufficient to detect BUOW if they return.

COMMENT 9: Other State Species of Special Concern

Issue: Tulare grasshopper mouse, San Joaquin coachwhip, western spadefoot, coast horned lizard, California glossy snake, and American badger can inhabit grassland and upland scrub habitats (Shuford and Gardali 2008, Thomson et al. 2016). All the species mentioned above have been documented to occur in the vicinity of the Project, which supports requisite habitat elements for these species (CDFW 2018).

Specific impact: Without appropriate avoidance and minimization measures for these species, potentially significant impacts associated with ground disturbance include habitat loss, nest/den/burrow abandonment, which may result in reduced health or vigor of eggs and/or young, and direct mortality.

Evidence impact is potentially significant: Habitat loss threatens all of the species mentioned above (Shuford and Gardali 2008, Thomson et al. 2016). Habitat within and adjacent to the Project represents some of the only remaining undeveloped land in the vicinity, which is otherwise intensively managed for agriculture. As a result, ground-and vegetation-disturbing activities associated with development of the Project have the potential to significantly impact local populations of these species.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to special-status species associated with subsequent development, CDFW recommends conducting the following evaluation of project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 29: Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment in advance of project implementation, to determine if project areas or their immediate vicinity contain suitable habitat for the species mentioned above.

Recommended Mitigation Measure 30: Surveys

If suitable habitat is present, CDFW recommends that a qualified biologist conduct focused surveys for applicable species and their requisite habitat features to evaluate potential impacts resulting from ground and vegetation disturbance.

Recommended Mitigation Measure 31: Avoidance

Avoidance whenever possible is encouraged via delineation and observance a 50-foot no-disturbance buffer around dens of mammals like the American badger as well as the entrances of burrows that can provide refuge for small mammals, reptiles, and amphibians.

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 CDFW or USFWS?

COMMENT 10: Wetland and Riparian Habitats

Issue: The Project area contains numerous waterways, riparian and wetland areas. Development within the Project has the potential to involve temporary and permanent impacts to these features.

Specific impact: Project activities have the potential to result in the loss of riparian and wetland vegetation, in addition to the degradation of wetland and riparian areas through grading, fill, and related development.

Evidence impact is potentially significant: The Project area includes stream and wetland features within an agricultural landscape that also maintains undeveloped habitats. Riparian and associated floodplain and wetland areas are valuable for their ecosystem processes such as protecting water quality by filtering pollutants and transforming nutrients; stabilizing stream banks to prevent erosion and sedimentation/siltation; and dissipating flow energy during flood conditions, thereby spreading the volume of surface water, reducing peak flows downstream, and increasing the duration of low flows by slowly releasing stored water into the channel through subsurface flow. Within the San Joaquin Valley, modifications of streams to accommodate human uses has resulted in damming, canalizing, and channelizing of many streams, though some natural stream channels and small wetland or wetted areas remain (Edminster 2002). The Fish and Game Commission policy regarding wetland resources discourages development or conversion of wetlands that results in any net loss of wetland acreage or habitat value. Construction activities within these features also has the potential to impact downstream waters as a result of Project site impacts leading to erosion, scour, and changes in stream morphology.

Recommended Potentially Feasible Mitigation Measure(s)

Recommended Mitigation Measure 32: Stream and Wetland Mapping

CDFW recommends that formal stream mapping and wetland delineation be conducted by a qualified biologist or hydrologist, as warranted, to determine the baseline location, extent, and condition of streams (including any floodplain) and wetlands within and adjacent to the Project area. Please note that while there is overlap, State and Federal definitions of wetlands differ, and complete stream mapping commonly differs from delineations used by the United States (U.S.) Army Corps of Engineers specifically to identify the extent of Waters of the U.S. Therefore, it is advised that the wetland delineation identify both State and Federal wetlands in the Project area as well as the extent of all streams including floodplains, if present, within the Project area. CDFW advises that site map(s) depicting the extent of any activities that may affect wetlands, lakes, or streams be included with any Project site evaluations, to clearly identify areas where stream/riparian and wetland habitats could be impacted from Project activities.

Recommended Mitigation Measure 33: Stream and Wetland Habitat Mitigation

CDFW recommends that the potential direct and indirect impacts to stream/riparian and wetland habitat be analyzed according to each Project activity. Based on those potential impacts, CDFW recommends that the EIR include measures to avoid, minimize, and/or mitigate those impacts. CDFW recommends that impacts to riparian habitat (i.e., biotic and abiotic features) take into account the effects to stream function and hydrology from riparian habitat loss or damage, as well as potential effects from the loss of riparian habitat to special-status species already identified herein. CDFW recommends that losses to stream and wetland habitats be offset with corresponding riparian and wetland habitat restoration incorporating native vegetation to replace the value to fish and wildlife provided by the habitats lost from Project implementation. If on-site restoration to replace habitats is not feasible, CDFW recommends offsite mitigation by restoring or enhancing in-kind riparian or wetland habitat and providing for the long-term management and protection of the mitigation area, to ensure its persistence.

Editorial Comments and/or Suggestions

Federally Listed Species: CDFW recommends consulting with USFWS regarding potential impacts to federally listed species including but not limited to SJKF, BNLL, and San Joaquin woollythreads. Take under the Federal Endangered Species Act (FESA) is more broadly defined than CESA; take under FESA also includes significant habitat modification or degradation that could result in death or injury to a listed species by interfering with essential behavioral patterns such as breeding, foraging, or nesting.

Consultation with the USFWS in order to comply with FESA is advised well in advance of any Project activities.

Lake and Streambed Alteration: Project activities have the potential to substantially change the bed, bank, and channel of lakes, streams, and associated wetlands onsite and/or substantially extract or divert the flow of any such feature that is subject to CDFW's regulatory authority pursuant Fish and Game Code section 1600 et seq. Fish and Game Code section 1602 requires an entity to notify CDFW prior to commencing any activity that may (a) substantially divert or obstruct the natural flow of any river, stream, or lake; (b) substantially change or use any material from the bed, bank, or channel of any river, stream, or lake (including the removal of riparian vegetation): (c) deposit debris, waste or other materials that could pass into any river, stream, or lake. "Any river, stream, or lake" includes those that are ephemeral or intermittent as well as those that are perennial.

CDFW is required to comply with CEQA in the issuance of a Lake or Streambed Alteration Agreement (LSAA); therefore, if the CEQA document approved for the Project does not adequately describe the Project and its impacts to lakes or streams, a subsequent CEQA analysis may be necessary for LSAA issuance. For information on notification requirements, please refer to CDFW's website (https://wildlife.ca.gov/Conservation/LSA) or contact CDFW staff in the Central Region Lake and Streambed Alteration Program at (559) 243-4593.

Surface Water Diversions from outside the Project Boundary: Project-related diversions acquiring surface water from outside of the Project boundary, including the Sacramento-San Joaquin River Delta (Delta); and San Joaquin, Kings, and Kern River watersheds (including South Fork Kern River watershed) may impact additional riparian, wetland, fisheries, and terrestrial (i.e., upland) wildlife species and habitats. Special-status species and habitats located in watersheds outside of the Project area vary depending upon location. They may include, but are not limited to, the Federal threatened Central Valley distinct population segment steelhead (*Oncorhynchus mykiss*), the Federal and State threatened Central Valley spring-run evolutionary significant unit (ESU) Chinook salmon (*O. tshawytscha*), the Federal candidate and State species of special concern Central Valley fall-run and late fall-run ESU Chinook salmon (*O. tshawytscha*), the State species of special concern hardhead (*Mylopharodon conocephalus*), the State and Federal threatened giant garter snake (*Thamnophis gigas*), the State threatened Swainson's hawk and tricolored blackbird, the species of special concern burrowing owl and western pond turtle, and numerous additional special-status species and habitats.

The South Fork Kern River Valley contains the largest contiguous cottonwood-willow riparian woodland in California. Rosedale owns and manages Onyx Ranch in the South Fork Kern River Valley. CDFW owns and manages the 7,200-acre Canebrake

Ecological Reserve located on either side of Onyx Ranch. The National Audubon Society owns and manages the Audubon Kern River Preserve, a 3,275-acre preserve located on several parcels to the west of Onyx Ranch. Both properties are to be protected in perpetuity and portions of them were set aside as mitigation for other projects such as Lake Isabella construction. Project-related activities resulting in surface water diversion could significantly impact habitat on these properties and the following sensitive habitats and special-status plant and wildlife species located in the South Fork Valley: Great Valley Cottonwood Forest, Central Valley Drainage Hardhead /Squawfish Stream, the Federal threatened and State endangered yellow-billed cuckoo (*Coccyzus americanus occidentalis*), the Federal and State endangered southwestern willow flycatcher (*Empidonax trailii extimus*) and least Bell's vireo (*Vireo bellii pusillus*), the State threatened tricolored blackbird, and numerous other special-status species.

CDFW recommends that the draft EIR analyze the proposed acquisition of surface water from all watersheds and any potential direct, indirect, and cumulative biological impacts to fish and wildlife species and their habitats, as well as to properties permanently conserved to protect those resources.

Water Rights: The Project proponents will seek to acquire additional water supplies from various potential sources. CDFW recommends that the draft EIR include a detailed description of the water rights and water entitlements for the points of diversion and places of use that pertain to the proposed Project. CDFW recommends including information on the historic and current water rights and water use agreements/contracts including pre-1914 and appropriative rights, riparian rights, prescriptive rights, and adjudications.

CDFW recommends that the draft EIR address whether Rosedale or IRWD will be filing a change petition or a new application for additional surface water. As stated previously, CDFW, as Trustee Agency, is consulted by the SWRCB during the water rights process to provide terms and conditions designed to protect fish and wildlife prior to appropriation of the State's water resources. Given the potential for impacts to sensitive species and their habitats, it is advised that required consultation with CDFW occur well in advance of the SWRCB water right application process.

Water Storage Investment Program: The proposed Project received a conditional award of funding through the California Water Commission's Water Storage Investment Program (WSIP) (Cal. Code Regs., tit. 23, § 6000 et seq.). The WSIP is funded by the Proposition 1 Water Quality, Supply and Infrastructure Act of 2014. The purpose of the WSIP is to fund water storage projects that provide public benefits, improve operation of the state water system, and provide a net improvement in ecosystem and water quality conditions. "Net Improvement" means the gain or enhancement of a resource condition determined by comparing the with- and without-project future conditions less any

negative outcomes of a proposed project, as defined in the WSIP regulations (Cal. Code Regs., tit.23, § 6001 (a)(50)).

"Public benefit(s)" as defined in WSIP are those public benefits associated with water storage projects outlined in Water Code section 79753(a). Ecosystem improvements is a public benefit which includes changing the timing of water diversions, improvement in flow conditions, temperature, or other benefits that contribute to restoration of aquatic ecosystems and native fish and wildlife, including those ecosystems and fish and wildlife in the Delta (Water Code § 79753(a)(1)). Ecosystems include both aquatic and terrestrial habitats and natural communities.

Pursuant to the requirements of Water Code section 79755, any project funded under WSIP shall enter into a contract with CDFW, the SWRCB, and DWR (administering agencies) to administer the public benefits of the project. CDFW is responsible for administering a contract with the Project for the implementation of ecosystem benefits that provide a net improvement.

Two ecosystem benefits proposed by the Project are pulse flow release from Oroville Reservoir and the provision of 1,280 acres of incidental wetland habitat in Kern County. CDFW will be coordinating with the Project to develop an ecosystem benefit contract and adaptive management plan for the Project. CDFW recommends that the draft EIR provide an assessment of the Project, including delivery of the WSIP public benefits. CDFW also recommends the draft EIR discuss CDFW permits or agreements that may potentially be required.

Nesting Birds: CDFW has jurisdiction over actions with potential to result in the disturbance or destruction of active nest sites or the unauthorized take of birds. Fish and Game Code sections that protect birds, their eggs and nests include sections 3503 (regarding unlawful take, possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the take, possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful take of any migratory nongame bird).

CDFW encourages Project implementation to occur during the bird non-nesting season; however, if Project activities must occur during the breeding season (i.e., February through mid-September), the Project applicant is responsible for ensuring that implementation of the Project does not result in violation of the Migratory Bird Treaty Act or relevant Fish and Game Codes as referenced above.

To evaluate Project-related impacts on nesting birds, CDFW recommends that a qualified wildlife biologist conduct pre-activity surveys for active nests no more than 10 days prior to the start of ground disturbance to maximize the probability that nests that could potentially be impacted by the Project are detected. CDFW also recommends that surveys cover a sufficient area around the work site to identify nests

and determine their status. A sufficient area means any area potentially affected by a project. In addition to direct impacts (i.e., nest destruction), noise, vibration, and movement of workers or equipment could also affect nests. Prior to initiation of construction activities, CDFW recommends that a qualified biologist conduct a survey to establish a behavioral baseline of all identified nests. Once construction begins, CDFW recommends that a qualified biologist continuously monitor nests to detect behavioral changes resulting from the project. If behavioral changes occur, CDFW recommends that the work causing that change cease and CDFW be consulted for additional avoidance and minimization measures.

If continuous monitoring of identified nests by a qualified wildlife biologist is not feasible, CDFW recommends a minimum no-disturbance buffer of 250 feet around active nests of non-listed bird species and a 500-foot no-disturbance buffer around active nests of non-listed raptors. These buffers are advised to remain in place until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival. Variance from these no-disturbance buffers is possible when there is compelling biological or ecological reason to do so, such as when the construction area would be concealed from a nest site by topography. CDFW recommends that a qualified wildlife biologist advise and support any variance from these buffers and notify CDFW in advance of implementing a variance.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database, which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e)). Accordingly, please report any special-status species and natural communities detected during Project surveys to the CNDDB. The CNNDB field survey form can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/CNDDB_FieldSurveyForm.pdf. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.asp.

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089).

CONCLUSION

CDFW appreciates the opportunity to comment on the NOP to assist Rosedale in identifying and mitigating Project impacts on biological resources.

If you have questions regarding these comments, please contact Annette Tenneboe, Senior Environmental Scientist (Specialist), at the address on this letterhead, by phone at (559) 243-4014 extension 231, or by email at Annette.Tenneboe@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Julie Vance
FA83F09FE08945A...

Julie A. Vance
Regional Manager

Attachment

ec: Office of Planning and Research
State Clearinghouse
state.clearinghouse.opr.ca.gov

Josh Grover
Linda Connolly
Annee Ferranti
Angela Llaban
Annette Tenneboe
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California Department of Fish and Wildlife

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Attachment 1

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
RECOMMENDED MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)

PROJECT: Kern Fan Groundwater Storage Project

RECOMMENDED MITIGATION MEASURES	STATUS/DATE/INITIALS
Before Disturbing Soil or Vegetation	
Recommended Mitigation Measure 1: SJKF Habitat Assessment	
Recommended Mitigation Measure 2: SJKF Surveys	
Recommended Mitigation Measure 3: SJKF Take Authorization	
Recommended Mitigation Measure 4: BNLL Habitat Assessment	
Recommended Mitigation Measure 5: BNLL Surveys	
Recommended Mitigation Measure 7: SJAS Habitat Assessment	
Recommended Mitigation Measure 8: SJAS Surveys	
Recommended Mitigation Measure 9: SJAS Avoidance	
Recommended Mitigation Measure 10: SJAS Take Authorization	
Recommended Mitigation Measure 11: TKR Habitat Assessment	
Recommended Mitigation Measure 13: TKR Surveys	
Recommended Mitigation Measure 14: TKR Take Authorization	
Recommended Mitigation Measure 15: Focused SWHA Surveys	
Recommended Mitigation Measure 17: Tree Removal	
Recommended Mitigation Measure 18: SWHA Take Authorization	
Recommended Mitigation Measure 19: TRBL Surveys	
Recommended Mitigation Measure 21: TRBL Take Authorization	
Recommended Mitigation Measure 22: Special-Status Plant Surveys	
Recommended Mitigation Measure 24: Listed Plant Species Take Authorization	
Recommended Mitigation Measure 25: BUOW Habitat Assessment	
Recommended Mitigation Measure 26: BUOW Surveys	

RECOMMENDED MITIGATION MEASURES	STATUS/DATE/INITIALS
Recommended Mitigation Measure 28: BUOW Passive Relocation and Mitigation	
Recommended Mitigation Measure 29: Habitat Assessment (Other Species of Special Concern)	
Recommended Mitigation Measure 30: Surveys (Other Species of Special Concern)	
Recommended Mitigation Measure 32: Stream and Wetland Mapping	
Recommended Mitigation Measure 33: Stream and Wetland Habitat Mitigation	
During Construction	
Recommended Mitigation Measure 6: BNLL Take Avoidance	
Recommended Mitigation Measure 12: TKR Avoidance	
Recommended Mitigation Measure 16: SWHA Avoidance	
Recommended Mitigation Measure 20: TRBL Colony Avoidance	
Recommended Mitigation Measure 23: Special-Status Plant Avoidance	
Recommended Mitigation Measure 27: BUOW Avoidance	
Recommended Mitigation Measure 31: Avoidance (Other Species of Special Concern)	

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May 8, 2020

VIA EMAIL eaverett@rrbwsd.com

Eric Averett
General Manager
Rosedale-Rio Bravo Water Storage District
P.O. Box 20820
Bakersfield, CA 93390-0820

Re: City of Bakersfield's Comments to Notice of Preparation of an Environmental Impact Report for Kern Fan Groundwater Storage Project.

Dear Mr. Averett:

On behalf of the City of Bakersfield ("City" or "Bakersfield"), we submit the following comments to the Notice of Preparation ("NOP") of an Environmental Impact Report ("EIR") for the Kern Fan Groundwater Storage Project ("Project") issued by the Rosedale-Rio Bravo Water Storage District ("Rosedale") on April 8, 2020.

1. Potential Transfer of Local Water Supplies Out of Area

The City is concerned that the Project will involve the transfer or sale of local water supplies, including the waters of the Kern River, out of Kern County to the Irvine Ranch Water District ("Irvine").

Irvine is a California Water District that provides water "to approximately 422,000 residents encompassing 181 square miles in central Orange County." (NOP, p. A-2.) The NOP indicates that one of the primary purposes and goals of the Project is to increase Irvine's water supply. Specifically, one of the "Project Objectives" is to provide Irvine's "customers and partners with increased water supply reliability during periods when other supply sources may be reduced or interrupted." (NOP, p. A-3.) The NOP further indicates that up to 37,500 acre-feet of "storage capacity" in the Project will be allocated to Irvine, and that Irvine will use water held in that "account" for "M&I uses." (NOP, p. A-4.)

The NOP also indicates that although the Project will primarily involve the recharge and recovery of State Water Project ("SWP") water supplies, the Project will also utilize other water supplies "from various sources, that may include federal, state, and local supplies." (NOP, p. A-5.) Those sources "may also include supplies from the CVP, and high-flow Kern River water depending on annual hydrologic availability, water rights and regulatory considerations." (Id.)

The City reminds Rosedale that sales and transfers of local water supplies out of the County are directly contrary to the policies and interests of the City. The City has a long standing policy that Kern River water shall not be utilized outside the boundaries of the San Joaquin Valley Portion of Kern County.

The Project would appear to violate the City's policy against transfers of local water supplies out of the County. Development of a water supply for Irvine within Kern County would seem to necessarily and logically involve the transfer of local water supplies out of the County to Orange County. The NOP, moreover, confirms that the Project could involve the storage and eventual transfer of Kern River water out of the County to Irvine.

The City is concerned that the out-of-county water transfers proposed through the Project could cause substantial harm to the local environment, the local groundwater basin, the City's water resources and supplies, the Kern River, and the water resources of the entire southern San Joaquin Valley. The City therefore reserves the right to challenge the Project to prevent harm to the City and local water supplies. The City also urges Rosedale to accurately, honestly and completely review the wide ranging potential impacts of the proposed transfer of local water supplies, including Kern River water, out of the area, to Southern California.

Rosedale, moreover, holds no Kern River water rights, but only receives Kern River water from the City pursuant to a water supply agreement. Rosedale is bound, through that agreement, to only use Kern River water acquired from the City within its boundaries. The City reserves the right to challenge and prevent any effort by Rosedale to violate the place of use restriction in that agreement, through the Project or otherwise.

2. Consistency and Compliance with SGMA

The NOP states "By storing additional surface water underground in Kern County, the proposed Project would benefit groundwater levels in the Kern County Sub-basin and help support groundwater sustainability efforts required by the Sustainable Groundwater Management Act." (NOP, p. A-4.) In the very next sentence, however, Rosedale states that the Project "would enhance water supply reliability for IRWD and its partners by augmenting supplies for periods when other sources may be limited or unavailable." (Id.) That statement indicates that through the Project local groundwater supplies will be transferred out of the basin to Southern California.

Those statements therefore appear contradictory, as transfers of groundwater out of the basin would appear to directly violate and contradict the goals, policies and requirements of the

Sustainable Groundwater Management Act ("SGMA"). The EIR should address and explain that apparent conflict.

The EIR should additionally explore and explain how the Project relates to, supports and impacts SGMA requirements, the Groundwater Sustainability Plan ("GSP") recently submitted to the State of California by Rosedale, and the goal's, programs and obligations set forth in Rosedale's GSP. The EIR should also consider the impact and effect of the Project, including the proposed potential transfer of Kern River water out of the County, on the goals, projects and requirements set forth in the GSPs for the entire basin, including the "master" GSP for the Kern Groundwater Authority GSA and the GSP for the Kern River GSA.

3. Water Supplies for Project

As indicated, the NOP states that the Project will primarily use SWP water supplies, but will also utilize other water supplies "from various sources, that may include federal, state, and local supplies," including Kern River water supplies. (NOP, p. A-5.)

To comply with CEQA, the EIR must identify, explain and analyze in detail the specific sources of water that will be utilized in the Project, and the impacts associated with the use of those water supplies. The EIR must identify the current uses of the water supplies that will be used in the Project, and must review and analyze the impacts arising from the shift of those water supplies to the Project. The EIR must also identify and discuss any uncertainties associated with the proposed use of specific water supplies and sources, as well as legal, regulatory and practical limitations on the use of the water supplies identified and discussed in the EIR. (*Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 431; See also *California Oak Foundation v. City of Santa Clarita* (2005) 133 Cal.App.4th 1219 (in which the court rejected an EIR because the water supply analysis relied, without adequate consideration of the uncertainties of SWP supplies, on the party's purchase of 41,000 acre-feet of SWP water).)

With regard to Kern River water, the EIR should identify and review the agreements, judgments, orders, policies and practices which govern and control the conveyance of water through the Kern River channel, and the diversion and use of water from the Kern River. Without that critical information, the EIR cannot properly review the impacts of the Project on the Kern River, other local waters supplies, and entities, such as Bakersfield, that hold Kern River water rights or which use and rely on Kern River water supplies.

The EIR must also identify the extent, source and nature of the Kern River water which may be used in the Project. Rosedale, for example, has filed an application with the State Water Resources Control Board ("SWRCB") to appropriate certain Kern River water supplies. If Rosedale proposes to use water acquired through that application in the Project, the EIR should identify, discuss and review the impacts arising from the use of those Kern River water supplies in the Project, including secondary and associated impacts involving the transfer of those Kern

River water supplies to Rosedale. The EIR should also identify, consider and review the competing applications to appropriate Kern River water in connection with the discussion of alternatives, and cumulative impacts, associated with the Project.

4. Impacts on Bakersfield

The City maintains water banking and spreading facilities in very close proximity to the Project. The City also recharges water in the Kern River channel, and thereafter extracts significant quantities of water through groundwater pumping. The Project would appear to have significant impacts on these activities and operations.

An EIR must consider all impacts of a project on the environment, even if the impacts would be felt by another agency. (*San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713.) The EIR must therefore thoroughly and properly assess the impact of the Project on the City, the City's water supply, and the City's use of water supplies. The EIR should also review and assess the impacts of the Project on the Kern River in general, and the environment in and around the Kern River.

5. Additional Issues and Questions

The City has the following additional comments, questions, and concerns regarding the NOP and the Project. These comments do not constitute or represent all of the City's concerns with the Project, or to the adequacy of Rosedale's, or Irvine's, compliance with CEQA.

- We understand that Rosedale did not prepare an Initial Study Environmental Checklist for the Project, presumably because it already recognizes that it is necessary to prepare an EIR for the Project. We also recognize that the NOP lists and discusses, at least briefly, all of the Environmental Factors included within an Initial Study Environmental Checklist. The EIR should still provide a detailed discussion and evaluation of all of those Environmental Factors, in at least the detail required in Initial Study Environmental Checklist.

- The EIR must consider reasonable alternatives that would satisfy the purpose and goals of the Project, including the objectives and goals of the Project, including conservation, additional sources of water, alternate storage locations, or other alternatives to the Project. It is particularly imperative that Rosedale, and Irvine, identify and consider alternatives that do not involve the transfer of local water supplies out of the Kern Subbasin.

- The EIR should identify and analyze the cumulative impacts of the Project on other banking and spreading projects in the vicinity of the Project, including banking and recharge projects operated by the City, such as the Kern River channel and the 2800 Acre recharge facility. The EIR should also identify and

discuss the cumulative impacts of the planned extraction of groundwater in connection with other groundwater pumping in the vicinity of the Project.

- The NOP indicates that the EIR for the Project will "evaluate the potential for the proposed Project to affect biological resources." (NOP, p. A-7.) The NOP further states that the EIR will review "how proposed Project operations could provide benefits to threatened and endangered fish species in the Delta, as well as benefits to wetland habitat and wildlife in the Kern Fan area." (Id.) The EIR, of course, must review **all** impacts associated with and resulting from the Project, including impacts on biological resources, and not just purported beneficial impacts. The transfer of Kern River water to Southern California, for example, as called for by the Project, could have significant adverse impacts on local biological resources.

- The NOP states that the EIR "will include a program-level analysis of the effects associated with operation of the proposed recovery facilities." (NOP, p. A-8.) The NOP further refers to later additional "site-specific analysis" and review of "project-level impacts associated with the recovery operations," but it is not clear if the EIR will include or incorporate a proper and complete "project level' review of the Project, including "recovery operations." The City maintains that Rosedale cannot approve the Project until and unless it has completely, properly and sufficiently reviewed all impacts arising from the Project, including "project level impacts" associated with the Project, including the "recovery operations" involved with and contemplated by the Project.

- The NOP states that because the Project "does not include the construction of new housing," the Project "would not directly induce population growth." (NOP, p. A-9.) The NOP states that the EIR will still "analyze the Project's potential to induce indirect population growth due to the recharge, storage and extraction of surface water stored underground." (Id.) The City points out that the Project would appear to **directly** induce population growth, and construction of new housing, because the Project will provide a supplemental water source for the "approximately 422,000 residents" within the boundaries of Irvine "in central Orange County." (NOP, p. A-2.) The EIR should therefore completely, properly and sufficiently review the impacts of the Project on population and housing growth, including within Orange County.

- The NOP very generally describes conveyance facilities that will be constructed or utilized in connection with the Project, including "a new turnout, additional canals and pipelines, and pump stations," and "proposed recharge and recovery facilities." (NOP, p. A-5.) The EIR must review and analyze all impacts associated with and resulting from the construction and operation of these conveyance facilities.

- The EIR should identify and discuss "areas of controversy," including any potential opposition to the Project from neighboring water districts, and residents and landowners in the region. (14 Cal. Code Regs. §15123.) That analysis is necessary and relevant, in part, because Rosedale is currently involved in litigation with the City with regard to Kern River water supplies, and Rosedale recently was involved in litigation with neighboring water districts and water banks, including the Kern Water Bank.

- On February 22, 2018, Rosedale issued an NOP for the "Onyx Ranch South Fork Valley Water Project." Bakersfield thereafter submitted detailed comments to the NOP, which comments identified a number of concerns with and objections to that project. The EIR for the present Project should explain the relationship, if any, between the two projects. In particular, the EIR should identify whether any water that would be produced by the Onyx Ranch project would be used in connection with the Project.

The statements and comments in this letter constitute only the City's comments to the NOP. The City reserves the right to comment on and raise appropriate objections and challenges to the Project, the EIR which will be prepared in connection with the Project, and any other efforts or approvals related to the Project.

We thank you for consideration of these comments. Please let us know if you have any questions with regard to these comments.

Sincerely,

Colin L. Pearce

CLP:bah

cc: Virginia Gennaro, City Attorney, City of Bakersfield
Art Chianello, Water Resources Manager, City of Bakersfield

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DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

May 8, 2020

Eric Averett
General Manager
Rosedale-Rio Bravo Water Storage District
P.O. Box 20820
Bakersfield, CA 93390-0820

Dear Mr. Averett:

This letter is to respond to the Notice of Preparation (NOP) that has been prepared to notify agencies and interested parties about the initiation of a California Environmental Quality Act (CEQA) review for the Kern Fan Groundwater Storage Project.

We anticipate that the California Department of Water Resources (DWR) could ultimately be a responsible agency, along with the California Department of Fish and Wildlife and the California Water Commission for this project. DWR anticipates agreements would be required with the Groundwater Banking Authority (Authority) and the Kern County Water Agency to implement the project. DWR would also need to coordinate with the Authority on CEQA requirements DWR may have on parts of the Project dealing with releases from Oroville Reservoir and a new turnout. Additionally, project descriptions would need to be developed for DWR discretionary actions in any CEQA document DWR may prepare.

DWR staff has been working with the Authority to review the project and to help analyze potential operational scenarios for consistency with State Water Project (SWP) operations. Through this cooperation we may identify additional issues to be included in the Authority's CEQA document.

For the purposes of this NOP we have identified the following subject areas related to the SWP that will warrant analysis for any potential impacts. These include:

-SWP water delivery operations
-Oroville storage
-Oroville recreation
-Fishery in the Feather River and downstream
-Energy impacts
-SWP water rights
-SWRCB water quality control planning
- Voluntary settlements
-Endangered Species Act compliance
-FERC Licensing requirements
-Construction on or near the California Aqueduct
-Subsidence on California Aqueduct

We also ask you to consider this Project's relationship to other projects under Water Storage Investigation Program for possible cumulative impacts. We note that the Project Description says that pulse flows released from Oroville Reservoir may be released in critically dry years. Initial analysis by DWR shows that releases in critically dry years are likely not possible. We will work with the Authority to further analyze this.

We look forward to working with the Authority on your EIR.

Sincerely,

Ted Craddock
Acting Deputy Director
State Water Project

cc: Holly Melton, Kern County Water Agency

May 8, 2020

50 Environmental

Mr. Eric Averett
Rosedale-Rio Bravo Water Storage District
P.O. Box 20820
Bakersfield, CA 93390-0820

Re: Notice of Preparation of an Environmental Impact Report for the Kern Fan Groundwater Storage Project

Dear Mr. Averett:

The Kern County Water Agency (Agency) would like to thank you for the opportunity to comment on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Kern Fan Groundwater Storage Project (Project).

The Agency was created by the California State Legislature in 1961 to contract with the California Department of Water Resources for State Water Project (SWP) water. The Agency has contracts with water districts throughout Kern County to deliver SWP water. The Agency also manages and/or is a participant in multiple groundwater banking projects, including the Kern Water Bank, Pioneer Property and Berrenda Mesa banking projects. Additionally, the Agency maintains and operates the Cross Valley Canal (CVC). Therefore, the Agency is uniquely qualified to provide comments.

The Agency is generally supportive of projects that seek to improve the water supply and reliability of Kern County water users. However, the proposed Project has the potential to significantly impact other water users within Kern County. Therefore, the EIR should demonstrate that the Project will not impact the Agency and other Kern County interests.

Comment 1: The EIR should evaluate the proposed Project facilities' impact on the California Aqueduct, nearby wells, existing Kern Fan banking projects and the CVC.

The NOP indicates the proposed Project will construct up to 12 extraction wells to recover up to 50,000 acre-feet (p. A-5). The document further indicates the proposed Project will construct additional facilities including canals, pipelines, pump stations and turnouts (p. A-5) within or nearby Rosedale-Rio Bravo Water

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Street Address
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Bakersfield, CA 93308

Storage District's (Rosedale) service area. The EIR should discuss and analyze the proposed Project facilities' impacts on the California Aqueduct, nearby wells, existing Kern Fan banking projects and the CVC, including but not limited to, impacts to groundwater levels and water deliveries, water quality and supplies.

Comment 2: The EIR should define and analyze coordinated operations.

The NOP makes multiple references to coordinated operations with Rosedale facilities, but does not describe what the coordination will entail. While the NOP indicates the "incremental" effects of coordinated operations will be analyzed (p. A-8), the EIR must also fully define coordinated operations so a meaningful analysis can be performed.

Comment 3: The proposed Project should ban the use of harmful chemicals in farming practices.

The NOP states the proposed Project "would be managed to allow agricultural land uses (e.g., annual farming or grazing) to continue when the basins are empty" (p. A-5). While the Agency is supportive of grazing operations, farming practices should be prohibited unless the use of pesticides and herbicides in farming practices on the property is banned to avoid water quality impacts from the various chemicals or their degradants during recharge operations.

Agency staff have coordinated and discussed with Rosedale and the California Department of Water Resources various aspects of the Project including the Ecosystem Account, Sacramento-San Joaquin Delta operations and California Aqueduct operations specifically within the Agency's service area and anticipate reviewing the detailed analyses in the EIR.

Agency staff looks forward to continuing to work with Rosedale to ensure the Agency's concerns are adequately addressed. If you have any questions, please contact Monica Tennant of my staff at (661) 634-1400.

Sincerely,

Holly Melton
Water Resources Manager

KERN WATER BANK AUTHORITY

May 8, 2020

Mr. Eric Averett
Rosedale – Rio Bravo Water Storage District
849 Allen Road
Bakersfield, CA 93302

Subject: Notice of Preparation of an Environmental Impact Report for the Kern Fan Groundwater Storage Project

Dear Mr. Averett:

The Kern Water Bank Authority (KWBA) appreciates the opportunity to provide comments on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Kern Fan Groundwater Storage Project (Project). The NOP indicates Rosedale – Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (Irvine) plan to develop a Project consisting of up to 1,300 acres of recharge basins and approximately 12 recovery wells capable of recharging approximately 100,000 AFY. Up to 25 percent of the recharge and storage capacity would be available to the Department of Water Resources; the remaining 75 percent would be split evenly between Rosedale and Irvine.

Some of the information that will be necessary for us to evaluate the Project will include:

- A cumulative analysis of all of Rosedale's and Irvine's banking and sales programs, including information regarding the ability of Rosedale to meet both the demands of the district's landowners and banking and sales obligations. This analysis should evaluate a worst-case scenario wherein Rosedale has to meet all its current and expected obligations during a prolonged drought, including the water level changes resulting from landowner groundwater pumping.
- Detailed analysis of the Project's expected impacts to water levels and quality. This analysis should consider the worst-case scenario wherein Rosedale needs to return water stored for all or its programs in consecutive years.
- Information on proposed well locations, screened intervals, expected recovery rates and recovery rate declines. The recovery rate declines will be important in evaluating the programs worst-case recovery scenarios mentioned above.

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- Regional studies have indicated the lands in the western Phase 2 Project area are underlain by the Corcoran or equivalent clay which would result in a shallower unconfined aquifer and deeper confined aquifer. How will the project address these conditions? If groundwater recovery is proposed within the confined aquifer, the analysis needs to address the potential for, and mitigation of, subsidence caused by the project.
- Detailed information on water sources for the Project, particularly with respect to water that will be sold or otherwise provided to IRWD by Rosedale.

Finally, and perhaps most importantly, the Department of Water Resources developed mitigation measures to reduce or otherwise mitigate impacts, including cumulative effects, from the Kern Water Bank and other water banking programs on the Kern Fan to less than significant (see attached). KWBA would expect the Project to consider, adopt and implement substantially similar measures for the Project.

Thank you for the opportunity to provide input for your proposed EIR. Please call if you have any questions.

Sincerely,
Kern Water Bank Authority,

Jonathan D. Parker,
General Manager

cc: KWBA Board of Directors and Counsel
Fiona Sanchez, Irvine Ranch Water District
David Okita, Department of Water Resources

KWBA Resolution
Attachment C

Mitigation Measures for KWBA Resolution

7.1-2 *KWBA will establish a program that meets the following requirements in accordance with the Long-Term Project Recovery Operations Plan regarding Kern Water Bank Project (2016 KWB Long-Term Operations Plan, Attachment A):*

A. *Monitor and Report Groundwater Conditions to KWBA's Board of Directors and the Public*

1) *KWBA will monitor groundwater levels monthly, except during periods of no recovery when monitoring will occur at least quarterly. KWBA may rely on monitoring conducted by the Kern Fan Monitoring Committee to meet these requirements.*

2) *KWBA will report current groundwater levels to its Board of Directors at each monthly regular meeting, and will make the reports available to the public on its website (http://www.kwb.org/).*

3) *KWBA will regularly update its Groundwater Model (Model) to actual conditions and use the Model to project future groundwater conditions. KWBA will endeavor to use the best practicable science and latest information available in all modeling and technical matters. KWBA will report the results of its modeling to its Board of Directors and will make the results available to the public on its website (http://www.kwb.org/). Recovery of banked groundwater in any calendar year beyond March 15 of that year shall not commence (or continue) until the Model has been run for projected KWB operations and the results have been reported to* KWBA's Board of Directors and made available to the public*. Model data for a preceding year becomes available at different times in the following year. Modeling at the beginning of any given year will necessitate estimating certain model input data for the preceding year (e.g., Kern River losses). These estimates will be replaced with actual data at regular intervals when the model is updated.*

B. *Implement Proactive Measures (in addition to A above)*

1) *KWBA will use its Model as a tool to evaluate potential groundwater impacts resulting from its project operations. The Model will be periodically run and updated as projected recovery plans become known or changed and the Model will assume such conditions as described in A.3.*

2) *The Model will be used to:*

a) *Forecast groundwater levels.*

b) *Forecast and predict the contribution of KWB Operations to groundwater level declines in the area.*

c) *Determine water level conditions with "Without KWB Operations" for purposes of evaluating the potential impact of "With KWB Operations". The "Without KWB Operations" is the water level that would have been at any particular well location absent "KWB Operations."*

d) *Identify, based upon an analysis of "Without KWB Operations" versus "With KWB Operations," if a* ***negative potential impact ("NPI")*** *has or is likely to occur for which the measures described at D, E, and F may be operative.* ***NPI*** *is determined according to C.1 below.*

e) *Forecast any localized areas for special attention and/or additional monitoring where groundwater levels will decline 30 or more feet below the "Without KWB Operations" groundwater level.*

f) *Identify wells at risk of potential impacts during recovery operations.*

3) *KWBA will provide notification on its website if the Model shows that an* ***NPI*** *has or is likely to occur, including steps that potentially affected landowners must follow if the landowner desires to make a claim to KWBA regarding potential well impacts due to KWBA's recovery operations.*

C. ***Implement Triggers and Actions***

The actions described in sections D, E, and F will be implemented in consultation with affected landowners/well owners that make a claim to KWBA regarding well impacts relating to KWBA's recovery operations and groundwater level declines, subject to the following:

1) *The trigger for mitigation shall be based upon an analysis and comparison of Model generated "Without KWB Operations" versus "With KWB Operations." When "With KWB Operations" are 30 feet deeper than the "Without KWB Operations" at an operative well, and the well has (or is expected to) experience mechanical failure or other operational problems due to declining water levels, a* ***negative potential impact ("NPI")*** *is triggered. If KWBA enters into a joint operations agreement with other water banks in the area, the depth at which a* ***NPI*** *is triggered shall provide an equivalent measure of potential impact as described in the 2016 KWB Long-Term*

Operations Plan.

2) *For a well owner to be eligible for mitigation as provided below, the affected landowner shall submit a claim to KWBA, in accordance with the Government Claims Act, which shall, at a minimum, provide information concerning the condition of the well and casing and pumping equipment of the well, and other information that is relevant to the landowner's claim. Upon receipt of a claim, KWBA shall use the Model (or the results of modeling as reported to the Board and the public) to determine whether an* ***NPI*** *exists at the landowner's well and respond with the appropriate action described below.*

3) *KWBA will provide mitigation and/or compensation for the KWB Operations' contribution to the adverse impact. Mitigation and/or compensation is not required for a well owner's lack of well maintenance, normal wear and tear, depreciation, failure of well equipment, well casing degradation, etc., or other reasons not relating to KWB Operations.*

D. ***Implement Action for Agricultural Wells When Well Adjustment Is Needed and Available***

1) *Trigger: When the Model predicts* ***NPI*** *for an operational agricultural well outside the current operating range of the pump but within the potential operating range of the well.*

2) *KWBA actions will be completed within 60 days (provided that the land/well owner cooperates) from receipt of a claim as follows:*

   a) Field verify (with the affected landowner if requested) static depth to groundwater levels within the well and compare to Model values to determine if flow stoppage is due to groundwater level decline due to KWB operations. If needed:

   - *Obtain right-of-entry permit and well data release from well owner.*
   - *Collect pump manufacturer data, the in-situ pump setting, and casing depth information.*

   b) Compare pump setting information with Model projected pumping water levels throughout the year to determine pump submergence levels and evaluate the necessity and feasibility of lowering the well pump to meet the landowner's needs to provide the least-cost short and long-term solution.

c) *Develop a cost estimate to complete the necessary work.*

d) *Develop and submit a report to the landowner informing the landowner of the findings and proposed actions, including denying the claim because groundwater declines are not due to KWB operations.*

3) *At KWBA's option, it may reduce or adjust pumping of its wells as necessary to prevent, avoid, or eliminate the **NPI**, using the Model to identify the well or wells that may require reduction or adjustment in pumping.*

4) *If groundwater declines are due to KWB operations, unless D.3 occurs, once agreement is reached between KWBA and the landowner pursuant to D.2.b and all cost estimates have been completed, pay costs associated with the landowner claim (considering C.3 above), including the cost to complete the necessary work.*

E. ***Implement Action for Agricultural Wells When Well Adjustment Is Unavailable***

1) *Trigger: When the Model predicts **NPI** for an operational agricultural well outside the current and potential operating range of the well.*

2) *KWBA actions will be completed within 60 days (provided that the land/well owner cooperates) from receipt of a claim as follows:*

a) *Field verify (with the affected landowner if requested) static depth to groundwater levels within the well and compare to Model values to determine if flow stoppage is due to groundwater level decline due to KWB operations. If needed:*

- *Obtain right-of-entry permit and well data release from well owner.*
- *Collect pump manufacturer data, the in-situ pump setting, and casing depth information.*

b) *Identify water of an equivalent water quantity and quality suitable for agricultural uses for the affected landowner from an alternate source at no greater cost to the affected landowner or, with the consent of the affected landowner, identify acceptable mitigation (for example, drill and equip a new well) to provide the least-cost short- and long-term solution, including an estimate to complete the necessary work.*

Develop and submit a report to the landowner informing the landowner of the findings and resulting proposed actions, including denying the claim because groundwater declines are not due to KWB operations.

3) *At KWBA's option, it may reduce or adjust pumping of its wells as necessary to prevent, avoid, or eliminate the **NPI** using the Model to identify the well or wells that may require reduction or adjustment in pumping.*

4) *If groundwater declines are due to KWB operations, unless E.3 occurs, once an agreement is reached between KWBA and the landowner to provide mitigation pursuant to E.2.b and all cost estimates have been completed, pay costs associated with the landowner claim (considering C.3 above), including the cost to complete the necessary work.*

F. ***Implement Action for Domestic Wells***

1) *Trigger: When the Model predicts **NPI** for a domestic well that is outside the current operating range of the pump but within the potential operating range of the well production.*

2) *KWBA's actions will be completed within 60 days (provided that the land/well owner cooperates) from receipt of a claim as follows:*

a) Field verify (with the affected landowner if requested) static depth to groundwater levels within the well and compare to Model values to determine if flow stoppage is due to groundwater level decline. If needed:

- *Obtain right-of-entry permit and well data release from well owner.*
- *Collect pump manufacturer data, the in-situ pump setting, and casing depth information.*

b) Identify availability and cost of a permanent connection to the nearest water service provider.

c) Identify acceptable mitigation (for example, lower the domestic submersible pump bowl setting sufficient to restore and maintain service or drill and equip a new well that complies with applicable county well standards) to provide the least-cost short- and long-term solution, including an estimate to complete the necessary work.

d) Develop and submit a report to the landowner informing the landowner of the findings and resulting proposed actions, including denying the claim because groundwater declines are not due to KWB operations.

e) If necessary for emergency health and safety concerns, provide interim in-home water supplies within 14 days after receipt of the claim until a permanent mitigation action is implemented or the claim has been denied because groundwater declines are not due to KWB operations.

3) *At KWBA's option, it may reduce or adjust pumping of its wells as necessary to prevent, avoid, or eliminate the **NPI** using the Model to identify the well or wells that may require reduction or adjustment in pumping.*

4) *If groundwater declines are due to KWB operations, unless F.3 occurs, once an agreement is reached for KWBA to provide mitigation pursuant to F.2.c above and all cost estimates have been completed, pay costs associated with the landowner claim (considering C.3 above), including the cost to complete the necessary work.*

7.1-7 *KWBA will implement the following measures in accordance with the KCWA and KWBA CVC Agreement (Attachment B):*

a) *KWBA will monitor water levels frequency, evaluating groundwater conditions on a weekly/monthly basis.*

b) *KWBA will coordinate water operations with KCWA*.

c) *KWBA will manage recharge operations to help ensure that groundwater gradient is away from the CVC during shallow groundwater conditions. Should groundwater conditions develop that might induce piping behind the CVC's liner, KWBA will minimize recharge adjacent to the CVC either by reducing inflow to adjacent ponds or increasing the setbacks of adjacent ponds.*

7.2-2 *KWBA will implement the following measures:*

b) *Hazardous waste sites would be subject to the county public health department and/or the CVRWQCB oversight with the responsible parties. KWBA will cooperate with the regulatory agency(s) during the process and provide pertinent groundwater elevations and water quality data the regulatory agencies may request.*

c) *On an annual basis, KWBA shall report the status of shallow groundwater level monitoring activities and water quality analysis in areas of contamination to the Kern Fan Monitoring Committee.*

d) *KWBA will continue to monitor and evaluate the nature and extent of any current and future contamination and remediation within KWB Lands as follows:*

i. *For all evaluation and monitoring activities performed by third parties on KWB Lands, KWBA shall obtain reports and sampling data as soon as they become available. Monitoring and evaluation shall continue until verification by third party documentation, regulatory correspondence, and/or laboratory analysis is obtained that indicates soil or groundwater contamination has been remedied and no longer provides a threat to groundwater quality.*

ii. *On an annual basis, KWBA shall report the status of contamination for each issue and provide water quality data monitoring activities, where available, to the Kern Fan Monitoring Committee. Any newly discovered contamination shall be reported to the Kern Fan Monitoring Committee immediately.*

7.2-3 *KWBA will implement the following measures:*

a) *Prior to construction, identify all plugged and abandoned wells through agency contacts. This includes identification of abandoned wells through the DOGGR website, field verification of an abandoned well prior to construction, notifying DOGGR of intent to construct a recharge pond adjacent to or over an abandoned well.*

b) *Modify excavation and grading activities to ensure the near surface seals and wellhead remain undamaged.*

c) *If the top of an abandoned well or wellhead is damaged during pond construction, appropriate authorities (i.e., DOGGR, CVRWQCB, and/or Kern County Environmental Health) will be notified as to the nature and extent of the damage along with plans to repair the damage, as needed and in accordance with existing regulations.*

7.4-3 *KWBA will implement the following terms required of KWBA as specified in the 1997 Monterey IS and Addendum, in this 2016 KWBA Resolution, and KWB HCP/NCCP, including Appendix A (Kern Water Bank Operations Manual), Appendix C (Kern Water Bank Vegetation Management Plan, and Appendix D (Kern Water Bank Waterbird Management Plan):*

a) *Biological Monitor*

A qualified biologist shall monitor all ground disturbing activities during construction in the Sensitive Habitat Sector and will oversee measures undertaken to reduce the take of listed species.

b) *Construction Practices*

i. *Delineation of Disturbance Areas – During construction, KWBA shall clearly delineate disturbance area boundaries by stakes, flagging, or by reference to terrain features, as provided in the KWB HCP/NCCP ~~directed by CDFG and USFWS~~ to minimize degradation or loss of adjacent wildlife habitats during operation.*

ii. *Signage – During construction, KWBA shall post signs and/or place fencing around construction sites to restrict access of vehicles and equipment unrelated to site operations.*

iii. *Resource Agency Notification – At least 20 working days prior to initiating ground disturbance for project facilities in designated salvage/relocation areas, KWBA shall notify the Fresno Field Office of CDFW~~G~~ and the Sacramento Field Office of USFWS of its intention to begin construction activities at a specific location and on a specific date. The agencies will have ten working days to notify the KWBA of their intention to salvage or relocate listed species in the construction area. If KWBA is notified, it shall wait an additional five days to allow the salvage/relocation to take place.*

iv. *Salvage and Relocation – KWBA shall allow time and access to USFWS and/or CDFW~~G~~, or their designees, to relocated listed species, at the Resource Agencies' expense, from construction areas prior to disturbance of areas that have been identified by the Resource Agencies as having known populations of the listed species they wish to salvage or relocate.*

v. *Construction Site Review – All construction pipes, culverts, or similar structures with a diameter of three inches or greater that are stored at a construction site on the Kern Water Bank for one or more overnight periods shall be thoroughly inspected for trapped kit foxes and other animals before the subject pipe is subsequently buried, capped, or otherwise used or moved in any way. Pipes laid in trenches overnight shall be capped. If during construction a kit fox or other animal is discovered inside a pipe, that section of pipe shall not be moved or, if necessary, shall be moved only once to remove it from the path of construction activity until the animal has escaped.*

vi. *Employee Orientation – An employee orientation program for construction crews, and others who will work on-site during construction, shall be conducted and shall consist of a brief consultation in which persons knowledgeable in endangered species biology and legislative protection explain endangered species concerns. The education program shall include a discussion of the biology of the listed species, the habitat needs of these species, their status under FESA and CESA, and measures being taken for the protection of these species and their habitats as a part of the project. The orientation program shall be conducted on an as needed basis prior to any new employees commencing work*

on the Kern Water Bank. Every two years or at the beginning of construction for the Supply/Recovery canal, a refresher course will be conducted for employees previously trained. A fact sheet conveying this information shall also be prepared for distribution to all employees. Upon completion of the orientation, employees shall sign a form stating that they attended the program and understand all protection measures. These forms shall be filed at KWBA's office and shall be accessible by CDWF~~G~~ and USFWS.

vii. *Standards for Construction of Canals – Concrete-lined canals will have a side slope of 1.5 to 1 or less and the sides will have a concrete finish which will assist in the escape of animals. If canals are determined by CDFW~~G~~ or USFWS to be substantial impediments to kit fox movement, plank or pipe crossings will be provided across concrete canals in areas identified as having high kit fox activity.*

c) *On-Going Practices*

i. *Equipment Storage - All equipment storage and parking during site development and operation shall be confined to the construction site or to previously disturbed off site areas that are not habitat for listed species.*

ii. *Traffic Control - KWBA's project representative shall establish and issue traffic restraints and signs to minimize temporary disturbances. All construction related vehicle traffic shall be restricted to established roads, construction areas, storage areas, and staging and parking areas. Project related vehicles shall observe a 25 MPH speed limit in all project areas except on county roads and state and federal highways.*

iii. *Food Control - All food-related trash items such as wrappers, cans, bottles, and food scraps generated both during construction and during subsequent facility operation shall be disposed of in closed containers and shall be regularly removed from the site. Food items may attract kit foxes onto a project site, consequently exposing such animals to increased risk of injury or mortality.*

iv. *Dog Control - To prevent harassment or mortality of kit foxes or destruction of kit fox dens or predation on this species; no domestic dogs or cats, other than hunting dogs, shall be permitted on-site.*

v. *Pesticide Use - Use of rodenticides and herbicides on the site shall be permitted in accordance with the Vegetation Management Plan, which incorporates by reference the Interim Measures for Use of Rodenticides in Kern County, and which will incorporate by reference any other applicable laws, rules, and regulations regarding the use of pesticides as they take effect.*

d) *Project Representatives*

KWBA shall designate a specific individual as a contact representative between KWBA, USFWS, and CDF<u>W</u>~~G~~ to oversee compliance with protection measures detailed herein. KWBA shall provide written notification of the contact representative to CDF<u>W</u>~~G~~ and USFWS within 30 days of issuance of the Permits and the Management Authorizations. Written notification shall also be provided by KWBA to CDF<u>W</u>~~G~~ and USFWS in the event that the designee is changed.

e) *Notification Regarding Dead, Injured or Entrapped Listed Animals*

Any employee or agent of KWBA who kills or injures a San Joaquin kit fox, blunt nosed leopard lizard, Tipton kangaroo rat, San Joaquin antelope squirrel, or other listed species listed as a threatened or endangered animal under FESA or CESA, or who finds any such animal either dead, injured, or entrapped on the Kern Water Bank shall report the incident immediately to KWBA's representative who shall, in turn, report the incident or finding to USFWS and CDF<u>W</u>~~G~~. In the event that such observations are of entrapped animals, escape ramps or structures shall be installed immediately to allow the animal(s) to escape unimpeded. In the event that such, observations are of injured or dead animals, KWBA shall immediately notify USFWS and CDF<u>W</u>~~G~~ by telephone or other expedient means. KWBA shall then provide formal notification to USFWS and CDF<u>W</u>~~G~~, in writing, within three working days of the finding of any such animal(s). Written notification shall include the date, time, location, and circumstances of the incident.

The USFWS contact for this information shall be the Assistant Field Supervisor for Endangered Species, Sacramento Field Office. The CDF<u>W</u>~~G~~ contact shall be the Environmental Services Supervisor at the San Joaquin Valley-Southern Sierra Region Headquarters.

USFWS or CDF<u>W</u>~~G~~ will be notified if any other animal, which is otherwise a listed species, is found dead or injured.

f) *Construction of Supply/Recovery Canal*

Within 60 days prior to the construction of the supply/recovery canal within the zone marked within the Map of the Kern Water Bank, KWBA shall conduct a limited survey within the area of the Kern Water Bank, which <u>will be</u> affected by that construction, with the sole goal of identifying potential San Joaquin kit fox dens. KWBA shall contact USFWS and CDF<u>W</u>~~G~~ pursuant to the salvage procedures set forth above if any kit fox dens are found.

g) *Take Avoidance Protocol for Fully Protected Species*

<u>Although a population of blunt nosed leopard lizards was relocated to the Kern Water Bank, there is no known present occurrence of them</u>. Existing data on the blunt nosed leopard lizard at the Kern Water Bank indicates that populations, <u>if they exist</u>, occur within habitat set asides (either sensitive, compatible, or conservation bank habitat), thus the likelihood of take from project construction, operation, and maintenance is negligible. However, in the future adaptive management measures may expand to areas of suitable habitat.

Three other species, which may be found on the Kern Water Bank, are also state designated fully protected species: American peregrine falcon, Greater sandhill crane, and White-tailed kite. The likelihood of the take of any of these species from project construction, operation, and maintenance is negligible due to their mobility and preferred habitats. ~~However, to avoid any take of these species, the same take avoidance protocol as set out for the blunt nosed leopard lizard shall apply to each of these three species.~~

KWBA will comply with the terms of the NCCP Approval and Take Authorization as it relates to ~~Until such time that the KWBA obtains appropriate authorization for take of the~~ state-designated fully protected species ~~blunt-nosed leopard lizard by the Fish and Game Commission, t~~ The following take avoidance protocol shall apply in any areas that contain suitable habitat for fully protected species not covered by authorization for take of state-designated fully protected species identified in this subsection (g) ~~of the blunt-nosed leopard lizard~~:

i. *A qualified biologist shall survey any areas proposed for project related disturbance that contain suitable habitat for fully protected species ~~the blunt-nosed leopard lizard~~ to determine the likelihood of presence. ~~Suitable habitat consists of valley and foothill grasslands, saltbush scrubland, iodine bush grassland, and alkali flats.~~*

ii. *If these fully protected species ~~blunt nosed leopard lizards~~ are found to occur in areas proposed for project facilities construction or maintenance, ~~consideration of~~ avoidance should take place. ~~first. If avoidance is not practicable, then the blunt nosed leopard lizard will be trapped and relocated prior to disturbance at KWBA's expense in accordance with the applicable annual management plan. This work must be done by or under the direction of USFWS staff by persons with appropriate experience and with their own take for scientific purposes permits. This procedure will avoid any violation of state law.~~*

The use of a biological monitor, and special construction activities and on- going practices will result in a heightened awareness and education regarding sensitive biological resources, which will reduce the potential for impacts on special-status species. In addition, the use of a project representative as a liaison between the KWBA and the resource agencies will expedite notification regarding any take of a listed animal. ~~While take of a fully protected species is not anticipated, this mitigation outlines avoidance protocol to further reduce the likelihood of said take.~~ Together these mitigation measures and the beneficial net increase of habitat for special- status species through implementation of the HCP/NCCP will reduce any potential impact to a less-than-significant level.

7.11-1 *KWBA will implement the following measures:*

c) *Provide a comprehensive Worker Environmental Awareness Program (WEAP) that will include all training requirements identified in Best Management Practices, Worker Site Specific Health and Safety Plan, and mitigation measures, including training for all field personnel (e.g., KWBA employees, agents, and contractors).*

The WEAP shall include protocols and training for responding to and handling of hazardous materials and hazardous waste management, and emergency preparedness, release reporting, and response requirements. KWBA will ensure that all construction workers at risk of inhaling dust shall be provided masks with filters designed to trap spores of the size of Valley Fever fungus.

7.11-4 *KWBA will implement the following measures:*

c) *KWBA shall implement the following measures before and during ground-disturbing activities to reduce health hazards associated with potential exposure to hazardous substances.*

i. *If stained or odorous soil is discovered during project-related construction activities, KWBA shall retain a qualified environmental professional to conduct a Phase II Environmental Site Assessment and/or other appropriate testing. Recommendations in the Phase II Environmental Site Assessment to address any contamination that is found shall be implemented before continuing with ground-disturbing activities in these areas.*

ii. *As required by law, notify the appropriate federal, state, and local agencies if evidence of previously undiscovered soil or groundwater contamination (e.g., stained soil, odorous groundwater) or if unknown or previously undiscovered underground storage tanks are encountered during construction activities.*

7.13-1a *KWBA will implement the following measures to minimize potential adverse impacts on cultural resources:*

a) *Prior to ground disturbance for new pond or well construction and associated facilities, an analysis to identify the potential presence of archaeological resources on the project site shall be conducted. The analysis shall include, at a minimum, a records check and literature survey from the appropriate California Historical Resources Information System (CHRIS) center and a Phase I Cultural Resources Investigation by an archaeologist meeting the Secretary of the Interior's Standards. If resources are known to exist on a project site, the analysis shall include an assessment of the resource and shall include measures for the in-situ protection, or the recovery, preservation, study, and curation of the resource, as appropriate. The analysis and the measures developed shall be consistent with the practices and intent described in Section 21083.2 et seq. of the Public Resources Code, as well as Sections 15064.5 et seq. and 15126.4(b) of the California Code of Regulations, and shall be consistent with current professional archaeological standards. The archaeologist shall prepare a report of the results of any study prepared, following accepted professional practice. Copies of the report shall be submitted to the KWBA and to the appropriate CHRIS information center. KWBA shall also consult, as appropriate, with the Native American Heritage Commission and appropriate Native American tribal representatives to address Native American cultural values with respect to archaeological contexts and places of traditional use or importance.*

b) *As a condition of all contracts for new pond or well construction and associated facilities and prior to ground-disturbing activities, all earth-moving and excavation contractor employees shall attend an orientation session informing them of the potential for inadvertently discovered cultural resources and/or human remains and protection measures to be followed to prevent destruction of any and all cultural resources discovered on site. The applicant's designated project construction manager, a qualified archaeologist, and a qualified cultural resource manager/monitor from a local California Native American tribe shall conduct the orientation (unless the local tribe opts not to participate). The orientation will include information regarding the potential for objects to occur on site, a summary of applicable environmental law, procedures to follow if potential cultural resources are found, and the measures to be taken if cultural resources and/or human remains are unearthed as part of the project.*

c) *Construction areas for new ponds and wells and associated facilities shall be staked prior to earthmoving by a qualified archaeologist in consultation with the contractor to indicate the construction area, construction staging area, and buffer. No earthmoving, parking, or materials storage will be allowed outside the staked areas. Prior to construction, the archaeologist shall survey the area to identify any surface artifacts within the staked area. An archaeologist and qualified cultural resource manager/monitor from a local California Native American tribe (unless the local tribe opts not to participate) shall be present during any grubbing or topsoil grading within the staked area. If previously unknown buried cultural resources, such as flaked or ground stone, historic debris, building foundations, or nonhuman bone (unless determined to be from present day grazing operations), are discovered during ground-disturbing activities, work will stop in that area and within an appropriate buffer area, as determined by the archaeologist. The archaeologist shall assess the significance of the affected cultural resources and, if necessary, develop feasible and appropriate treatment measures in consultation with the project staff, such as avoidance, capping with geotextile and fill, or Phase III data recovery consistent with applicable standards adopted pursuant to the National Historic Preservation Act.*

d) *In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately, the area of the find shall be protected, and KWBA immediately shall notify the County Coroner of the find and comply with the provisions of PRC Section 5097 with respect to Native American involvement, burial treatment, and re-burial, if necessary.*

7.13-1b *KWBA will implement the following measures to minimize potential adverse impact on previously unknown potentially unique, scientifically important paleontological resources:*

a) *Before the start of any well-drilling activities, KWBA shall retain a qualified paleontologist or other qualified individual to train all personnel involved with earthmoving and/or well drilling activities regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and proper notification procedures should fossils be encountered (this training can take place at the same time as the orientation required by 7.13-1a).*

b) *In the event that paleontological resources are discovered, KWBA will notify a qualified paleontologist. The paleontologist will document the discovery as needed, evaluate the potential resource, and assess the significance of the find under the criteria set forth in CEQA Guidelines Section 15064.5. If fossil or fossil bearing deposits are discovered during construction, excavations within 50 feet of the find will be temporarily halted or diverted until the discovery is examined by a qualified paleontologist. The paleontologist will notify the appropriate agencies to determine procedures that would be followed before construction is allowed to resume at the location of the find. If KWBA determines that avoidance is not feasible, the paleontologist will prepare an excavation plan for mitigating the effect of the project on the qualities that make the resource important. The plan will be submitted to KWBA for review and approval prior to implementation. The analysis and measures developed shall be consistent with the Conformable Impact Mitigation Guidelines developed by the Society of Vertebrate Paleontology and current professional paleontological standards.*

12-1 *KWBA will implement the following measures:*

a) ***Pump Efficiency Monitoring****: KWBA will conduct pump efficiency monitoring to ensure that all KWB pumps are monitored and evaluated at regular intervals during recovery periods.*

i. *Daily Pump Efficiency Monitoring: Pumps shall be monitored daily for their total water volume pumped (acre-feet [AF]) and electricity consumption (kilowatt-hours [kWh]), which will be used to calculate a daily energy efficiency value (i.e., kWh/AF).*

ii. *Pump Efficiency Software: Metro or an equivalent water system management program will be used to provide up-to-date and streamlined methods to analyze KWB's individual pump and total system efficiency.*

b) ***Pump Rehabilitation, Retrofits, and Replacement****: KWBA shall use data from the Pump Efficiency Monitoring component to strategically and actively rehabilitate, retrofit, and/or replace pumps as needed during recovery periods.*

i. *Pump Prioritization and Testing: Pump rehabilitation, retrofit, and replacement shall be prioritized by accounting for the relative efficiency of each pump with respect to the total pump system and water volume pumped through each pump. Data obtained from the Pump Efficiency Monitoring component shall be used to prioritize which pumps will be rehabilitated, retrofitted, and/or replaced. In addition efficiency testing by external entities if available (e.g., pump company, Pacific Gas & Electric Company [PG&E]) or other similar analysis will also be used for the prioritization process.*

ii. *Schedule: KWBA shall rehabilitate, retrofit, and/or replace pumps/wells at the earliest possible time without substantially disturbing ongoing O&M activities, but at a minimum will rehabilitate, retrofit, and/or replace at least an annual average of 5 pumps per year during a prolonged recovery period such as occurred between 2013 and 2016.*

c) ***Reporting****: KWBA will maintain a quarterly and annual reporting program that will be publicly available online. Annual reports will cover calendar years and be posted online by March 30 to cover the previous year. Quarterly reports will be posted online within 30 days of the end of each calendar quarter. The annual and quarterly reports will include, but are not limited to, the following components:*

i. *KWB O&M Totals: Total quarterly electricity consumption for recovery pumping activities along with total acre-feet recovered shall be provided online. A running total of the annual electricity consumption and acre-feet recovered by quarter shall also be provided.*

ii. *Pump Efficiency: A summary of the pump efficiency (kWh/acre-feet) for each of KWB's pumps will be provided quarterly. Similar to the KWB O&M Totals, a running annual average efficiency for each pump shall be provided. These data shall be used to identify the 5 pumps per year that will be rehabilitated, retrofitted, or replaced. If a pump/well is adjusted for depth, notes shall be made within the reports to explain these changes in pump efficiency.*

iii. *Electricity Efficiency Actions: Each report should include actions taken in the previous quarter to rehabilitate, retrofit, and/or replace pumps. Any other energy efficiency measures taken will be reported. When information is available from PG&E's Advanced Pumping Efficiency Program or other similar programs, annual electricity savings from these actions shall be included in the quarterly and annual reports to clearly show the electricity savings associated with rehabilitation, retrofit, and/or replacement actions. If annual energy savings cannot be determined through pre- and post-pump improvement testing, KWBA shall report the empirical annual energy savings (kWh/year) from these improvements in its annual reports.*

iv. *Identifying Next Steps: Each annual report will include the list of 5 or more pumps planned to be evaluated for potential rehabilitation, retrofit, or replacement during that year. If all five of the least efficient pumps are not scheduled for rehabilitation, retrofit, and/or replacement in the coming year, the annual report shall explain what KWB operation requires the pump to remain in service that year.*

d) ***Pump Compliance:*** *KWBA will only purchase new pumps that comply with United States Department of Energy pump efficiency regulations (10 CFR Part 429 and 431) when those regulations become effective in the marketplace in 2020.*

e) ***Future Increases in Technology and Emissions Standards:*** *KWBA shall actively consider replacing older pumps with new pumps with increased efficiency technology. All future requirements for pumps at the federal, state, and/or local level shall be complied with.*

Appendix B
Rosedale Operations Plans

ESA

FIRST AMENDED
MEMORANDUM OF UNDERSTANDING
REGARDING OPERATION AND MONITORING
OF THE
ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT
GROUNDWATER BANKING PROGRAM

This Memorandum of Understanding is entered into the Effective Date hereof by and among **ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT**, hereinafter referred to as "Rosedale", and **SEMITROPIC WATER STORAGE DISTRICT, BUENA VISTA WATER STORAGE DISTRICT, HENRY MILLER WATER DISTRICT, KERN COUNTY WATER AGENCY, KERN WATER BANK AUTHORITY, IMPROVEMENT DISTRICT NO. 4 OF THE KERN COUNTY WATER AGENCY**, and **WEST KERN WATER DISTRICT**, collectively referred to as "Adjoining Entities."

R E C I T A L S

WHEREAS, Rosedale expects that certain real property more particularly shown on the map attached hereto as Exhibit A and incorporated herein by this reference ("Project Site"), or portions thereof, will be used in connection with the Project; and

WHEREAS, Rosedale intends to develop and improve the Project Site as necessary to permit the importation, percolation and storage of water in underground aquifers for later recovery, transportation and use for the benefit of Rosedale, all as more fully described in Exhibit B attached hereto and incorporated herein by this reference ("Project"); and

WHEREAS, Adjoining Entities encompass lands and/or operate existing projects lying adjacent to the Project Site as shown on said Exhibit A; and

WHEREAS, in recent years, water banking, recovery and transfer programs in Kern County have become increasingly numerous and complex; and

WHEREAS, it is appropriate and desirable to mitigate or eliminate any short-term and long-term significant adverse impacts of new programs upon potentially affected projects and landowners within the boundaries of Adjoining Entities; and

WHEREAS, Adjoining Entities and Rosedale desire that the design, operation and monitoring of the Project be conducted and coordinated in a manner to insure that the beneficial effects of the Project to Rosedale are maximized but that the Project does not result in significant adverse impacts to water levels, water quality or land subsidence within the boundaries of Adjoining Entities, or otherwise interfere with the existing and ongoing programs of Adjoining Entities; and

WHEREAS, on October 26, 1995, the Kern Water Bank Authority and its Member Entities, as the "Project Participants," and Buena Vista Water Storage District, Rosedale-Rio Bravo Water Storage District, Kern Delta Water District, Henry Miller Water District and West Kern Water District, as the "Adjoining Entities," entered into a Memorandum of Understanding, similar to this Memorandum of Understanding, which provided among other things at Paragraph 8 that for "any future project within the Kern Fan Area, the Parties hereto shall use good faith efforts to negotiate an agreement substantially similar in substance to this MOU," and by entering into this MOU the Adjoining Entities find that this MOU satisfies such requirement for the Project; and

WHEREAS, Rosedale intends to operate its Project such that the same does not cause or contribute to overdraft of the groundwater basin; and

WHEREAS, in connection with its environmental review for the Project, Rosedale commissioned a hydrologic balance study for a period of years, which study shows that the District is not currently operating in a state of overdraft, and, further, Rosedale has projected said hydrologic balance study into the future, assuming completion of the Project, and said projection demonstrates that the District is not expected to operate in state of overdraft following implementation of the Project, which studies have not been independently verified by the Adjoining Entities; and

WHEREAS, in the hydrologic balance studies conducted by Rosedale in connection with the Project, the annual safe yield from the groundwater basin is assumed to be .3 acre-feet per acre times the gross developed acres in the District and no assumption is included with respect to groundwater inflow or outflow; and

WHEREAS, this MOU affects the Project and other similar banking programs operated for the benefit of third parties. Conversely, this MOU does not apply to or permit any project involving the sale by Rosedale of water banked in the name of, and within the boundaries of, Rosedale to third parties for a use outside the boundaries of Rosedale.

NOW, THEREFORE, BE IT RESOLVED that, based upon the mutual covenants contained herein, the parties hereto agree as follows:

1. Project Design and Construction. Rosedale has completed a preliminary Project Description of the Project described in Exhibit B hereto representing the contemplated facilities for the Project. Said preliminary description has been reviewed by the parties hereto. The foregoing shall not be interpreted to imply consent to any aspect of any future project not described in existing approved environmental documentation. Rosedale will construct the Project consistent with such preliminary description. Any major modifications of the facilities and/or significant changes from that described in Exhibit B and in the environmental documentation for the Project will be subject to additional environmental review pursuant to CEQA and will be subject to review of the Monitoring Committee prior to implementation.

2. Project Operation. The Project shall be operated to achieve the maximum water storage and withdrawal benefits for Rosedale consistent with avoiding, mitigating or eliminating to the greatest extent practicable, significant adverse impacts resulting from the Project. To that end, the Project shall be operated in accordance with the following Project Objectives and Minimum Operating Criteria:

a. Project Objectives. Consistent with the Project description, Rosedale will make a good faith effort to meet the following objectives, which may or may not be met:

(1) The parties should operate their projects in such manner as to maintain and, when possible, enhance the quality of groundwater within the Project Site and the Kern Fan Area as shown in Exhibit C.

(2) If supplies of acceptable recharge water exceed recharge capacity, all other things being equal, recharge priority should be given to the purest or best quality water.

(3) Each project within the Kern Fan Area should be operated with the objective that the average concentration of total dissolved salts in the recovered water will exceed the average concentration of total dissolved salts in the recharged water, at a minimum, by a percentage equal to or greater than the percentage of surface recharge losses. The average shall be calculated from the start of each project.

(4) To maintain or improve groundwater quality, recovery operations should extract poorer quality groundwater where practicable. Blending may be used to increase recovery of lesser quality groundwater unless doing so will exacerbate problems by generating unfavorable movement of lesser quality groundwater. It is recognized that the extent to which blending can help to resolve groundwater quality problems is limited by regulatory agency rules regarding discharges into conveyance systems used for municipal supplies, which may be changed from time to time.

(5) All groundwater pumpers should attempt to control the migration of poor quality water. Extensive monitoring will be used to identify the migration of poor quality water and give advance notice of developing problems. Problem areas may be dealt with by actions including, but not limited to:

(a) limiting or terminating extractions that tend to draw lesser quality water toward or into the usable water areas;

(b) increasing extractions in areas that might generate a beneficial, reverse gradient;

(c) increasing recharge within the usable water area to promote favorable groundwater gradients.

(6) It is intended that all recovery of recharged water be subject to the so-called "golden rule." In the context of a banking project, the "golden rule" means that, unless acceptable mitigation is provided, the banker may not operate so as to create conditions that are worse than would have prevailed absent the project giving due recognition to the benefits that may result from the project, all as more fully described at paragraph 2(b)12 below.

(7) The Project shall be developed and operated so as to prevent, eliminate or mitigate significant adverse impacts. Thus, the Project shall incorporate mitigation measures as necessary. Mitigation measures to prevent significant adverse impacts from occurring include but are not limited to the following: (i) spread out recovery area; (ii) provide buffer areas between recovery wells and neighboring overlying users; (iii) limit the monthly, seasonal, and/or annual recovery rate; (iv) provide sufficient recovery wells to allow rotation of recovery wells or the use of alternate wells; (v) provide adequate well spacing; (vi) adjust pumping rates or terminate pumping to reduce impacts, if necessary; (vii) impose time restrictions between recharge and recovery to allow for downward percolation of water to the aquifer; and (viii) provide recharge of water that would otherwise not recharge the Kern Fan Basin. Mitigation measures that compensate for unavoidable adverse impacts include but are not limited to the following: (i) with the consent of the affected groundwater pumper, lower the pump bowls or deepen wells as necessary to restore groundwater extraction capability to such pumper; (ii) with the consent of the affected groundwater pumper, provide alternative water supplies to such pumper; and (iii) with the consent of the affected groundwater pumper, provide financial compensation to such pumper.

b. Minimum Operating Criteria.

(1) The Monitoring Committee shall be notified prior to the recharge of potentially unacceptable water, such as "produced water" from oilfield operations, reclaimed water, or the like. The Monitoring Committee shall review the proposed recharge and make recommendations respecting the same as it deems appropriate. Where approval by the Regional Water Quality Control Board is required, the issuance of such approval by said Board shall satisfy this requirement.

(2) Recharge may not occur in, on or near contaminated areas, nor may anyone spread in, on or near an adjoining area if the effect will be to mound water near enough to the contaminated area that the contaminants will be picked up and carried into the uncontaminated groundwater supply. When contaminated areas are identified within or adjacent to the Project, Rosedale shall also:

(a) participate with other groundwater pumpers to investigate the source of the contamination;

(b) work with appropriate authorities to ensure that the entity or individual, if any, responsible for the contamination meets its responsibilities to remove the contamination and thereby return the Project Site to its full recharge and storage capacity;

(c) operate the Project in cooperation with other groundwater pumpers to attempt to eliminate the migration of contaminated water toward or into usable water quality areas.

(3) Operators of projects within the Kern Fan Area will avoid operating such projects in a fashion so as to significantly diminish the natural, normal and unavoidable recharge of water

native to the Kern Fan Area as it existed in pre-project condition. If and to the extent this occurs as determined by the Monitoring Committee, the parties will cooperate to provide equivalent recharge capacity to offset such impact.

(4) The mitigation credit for fallowed Project land shall be .3 acre-feet per acre per year times the amount of fallowed land included in the Project Site in the year of calculation.

(5) The lands shown in Exhibit A may be utilized for any purpose provided, however, the use of said property by Rosedale for the Project shall not cause or contribute to overdraft of the groundwater basin.

(6) Each device proposed to measure recharge water to be subsequently recovered and/or recovery of such water will be initially evaluated and periodically reviewed by the Monitoring Committee. Each measuring device shall be properly installed, calibrated, rated, monitored and maintained by and at the expense of the owner of the measuring device.

(7) It shall be the responsibility of the user to insure that all measuring devices are accurate and that the measurements are provided to the Monitoring Committee at the time and in the manner required by the Monitoring Committee.

(8) A producer's flow deposited into another facility, such as a transportation canal, shall be measured into such facility by the operator thereof and the measurement reported to the Monitoring Committee at the time and in the manner required by such Monitoring Committee.

(9) The Monitoring Committee or its designee will maintain official records of recharge and recovery activities, which records shall be open and available to the public. The Monitoring Committee will have the right to verify the accuracy of reported information by

inspection, observation or access to user records (i.e., P.G.&E. bills). The Monitoring Committee will publish or cause to be published annual reports of operations.

(10) Losses shall be assessed as follows:

(a) Surface recharge losses shall be fixed and assessed at a rate of 3%, which includes a "safety factor" of 1% of water diverted for direct recharge. An additional surface recharge loss of 3% shall be fixed and assessed against water directly recharged which is subsequently extracted for out-of-district use. Such initial 3% loss may be modified in the future if studies acceptable to the parties demonstrate that such modification is appropriate, providing that a 1% "safety factor" shall be maintained and the total loss when directly recharged water is subsequently extracted for out-of-district use shall not exceed 6%. Notwithstanding anything to the contrary provided herein, water banked in Rosedale for or on behalf of third parties (i.e., creating a third party bank account) shall be subject to surface recharge losses calculated at 6% of water diverted for direct recharge.

(b) To account for all other actual or potential losses (including migration losses), a rate of 4% of water placed in a bank account shall be deducted to the extent that Rosedale has been compensated within three (3) years following the end of the calendar year in which the water was designated as banked at the SWP Delta Water Rate charged by DWR at the time of payment; provided further, however, that the water purchased and subtracted from a groundwater bank account pursuant to this provision shall only be used for overdraft correction within the District purchasing the water.

(c) An additional 5% loss shall be assessed against any water diverted to the Project Site for banking by, for, or on behalf of any out-of-County person, entity or organization (except current SWP Agricultural Contractors).

(d) All losses provided for herein represent amounts of water that are non-bankable and non-recoverable by Rosedale.

(11) Recovery of banked water shall be from the Project Site and recovery facilities shall be located therein. Recovery from outside the Project Site may be allowed with the consent of the District or entity having jurisdiction over the area from which the recovery will occur and upon review by the Monitoring Committee.

(12) Recovery of banked water may not be allowed if not otherwise mitigated if it will result in significant adverse impacts to surrounding overlying users. "Adverse impacts" will be evaluated using data applicable in zones including the area which may be affected by the Project of approximately five miles in width from the boundaries of the Project as designated by the Monitoring Committee. In determining "adverse impacts," as provided at this paragraph and elsewhere in this MOU, consideration will be given to the benefits accrued over time during operation of the Project to landowners surrounding the Project Site including higher groundwater levels as a result of operation of the Project. In determining non-Project conditions vs. Project conditions, credit toward mitigation of any otherwise adverse impacts shall be recognized to the extent of the 4% loss and 5% losses recognized under paragraphs 2.b.(10)(b) and (c), for the mitigation credit recognized under paragraph 2.b.(4), if any, and to the extent of recharge on the Project Site for overdraft correction.

(13) To the extent that interference, other than insignificant interference, with the pumping lift of any existing active well as compared to non-Project conditions, is attributable to pumping of any wells on the Project Site, Rosedale will either stop pumping as necessary to mitigate the interference or compensate the owner for such interference, or any combination thereof. The Monitoring Committee will establish the criteria necessary to determine if well interference, other than insignificant interference, is attributable to pumping of Project wells by conducting pumping tests of Project wells following the installation of monitoring wells (if not already completed) and considering hydrogeologic information.

(14) The Kern Fan Element Groundwater Model, with input from Rosedale and the Adjoining Entities, and utilizing data from a comprehensive groundwater monitoring program, may be used by the Monitoring Committee as appropriate to estimate groundwater impacts of the Project.

(15) The parties recognize that the Project shall be operated with a positive balance, i.e., there shall be no "borrowing" of water for recovery from the basin.

3. Project Monitoring. Adjoining Entities agree to participate in a comprehensive monitoring program and as members of a Monitoring Committee, as hereinafter more particularly described, in order to reasonably determine groundwater level and water quality information under Project and non-Project conditions. The monitoring program will more particularly require the following:

a. Monitoring Committee: Rosedale and the Adjoining Entities shall form a Monitoring Committee for the Project upon terms and conditions acceptable to the participants. The Monitoring Committee shall:

(1) Engage the services of a suitable independent professional groundwater specialist who shall, at the direction of the Committee, provide assistance in the performance of the tasks identified below;

(2) Meet and confer monthly or at other intervals deemed to be appropriate in furtherance of the monitoring program;

(3) Establish a groundwater evaluation methodology or methodologies;

(4) Prepare a monitoring plan and two associated maps, "Well Location, Water Quality Network," and "Well Location, Water Level Network," which plan and maps depict the location and types of wells anticipated to be used in the initial phase of groundwater monitoring (said plan and maps are expected to be modified from time to time as the monitoring program is developed and operated);

(5) Specify such additional monitoring wells and ancillary equipment as are deemed to be necessary or desirable for the purposes hereof;

(6) Prepare annual water balance studies and other interpretive studies, which will designate all sources of water and the use thereof within the study area;

(7) Develop criteria for determining whether excessive mounding or withdrawal is occurring or is likely to occur in an area of interest;

(8) Annually or as otherwise needed determine the impacts of the Project on each of the Adjoining Entities by evaluating with and without Project conditions; and

(9) Develop procedures, review data, and recommend Project operational criteria for the purpose of identifying, verifying, avoiding, eliminating or mitigating, to the extent practicable, the creation of significant imbalances or significant adverse impacts.

b. Collection and Sharing of Data. The Adjoining Entities will make available to the Monitoring Committee copies of all relevant groundwater level, groundwater quality, and other monitoring data currently collected and prepared by each. Rosedale shall annually report, by areas of interest, water deliveries for banking and other purposes, groundwater withdrawals from bank accounts, transfers and other changes in account balances.

c. Monitoring Costs.

(1) The cost of constructing monitoring wells and ancillary equipment within Rosedale shall be borne by Rosedale. The cost of any new or additional monitoring wells and ancillary equipment outside the boundaries of Rosedale shall be borne as may be determined by separate agreement of Rosedale and the Adjoining Entities.

(2) Each of the parties shall be responsible for the personnel costs of its representative on the Monitoring Committee. In addition, the Adjoining Entities shall be responsible for all costs of monitoring operations and facilities within their respective boundaries and Rosedale shall be responsible for all costs of monitoring operations and facilities within the Project Site.

(3) All other groundwater monitoring costs, including employment of the professional groundwater specialist, collection, evaluation and analyses of data as adopted by the Monitoring Committee, shall be allocated among and borne by the parties as they shall agree among themselves. Cost sharing among Adjoining Entities shall be as agreed by them. Any additional monitoring costs shall be determined and allocated by separate agreement of those parties requesting such additional monitoring.

4. Modification of Project Operations. The Monitoring Committee may make recommendations to Rosedale, including without limitation recommendations for modifications in Project operations based upon evaluation(s) of data which indicate that excessive mounding or withdrawal is occurring or is likely to occur in an area of interest. The Monitoring Committee and its members shall not act in an arbitrary, capricious or unreasonable manner.

5. Dispute Resolution.

a. Submission to Monitoring Committee. All disputes regarding the operation of the Project or the application of this MOU, or any provision hereof, shall first be submitted to the Monitoring Committee for review and analysis. The Monitoring Committee shall meet and review all relevant data and facts regarding the dispute and, if possible, recommend a fair and equitable resolution of the dispute. The Monitoring Committee and its members shall not act in an arbitrary, capricious or unreasonable manner. In the event that (1) the Monitoring Committee fails to act as herein provided, (2) any party disputes the Monitoring Committee's recommended resolution or (3) any party fails to implement the Monitoring Committee's recommended resolution within the time allowed, any party to this MOU may seek any legal or equitable remedy available as hereinafter provided.

b. Arbitration. If all of the parties agree that a factual dispute exists regarding any recommendation of the Monitoring Committee made pursuant hereto, or implementation thereof, such dispute shall, be submitted to binding arbitration before a single neutral arbitrator appointed by unanimous consent and, in the absence of such consent, appointed by the presiding judge of the Kern County Superior Court. The neutral arbitrator shall be a registered civil engineer, registered geologist, or other person agreeable to the parties, preferably with a background in groundwater hydrology. The arbitration shall be called and conducted in accordance with such rules as the contestants shall agree upon, and, in the absence of such agreement, in accordance with the procedures set forth in California Code of Civil Procedure section 1282, et seq. Any other dispute may be pursued through a court of competent jurisdiction as otherwise provided by law.

c. Burden of Proof. In the event of arbitration or litigation under this MOU, all parties shall enjoy the benefit of such presumptions as are provided by law but, in the absence thereof, neither party shall bear the burden of proof on any contested legal or factual issue.

d. Landowner Remedies. Nothing in this MOU shall prevent any landowner within the boundaries of any party from pursuing any remedy at law or in equity in the event such landowner is damaged as a result of projects within the Kern Fan Area.

6. Term. The Effective Date of this MOU shall be January 1, 2003 regardless of the date of actual execution. This MOU shall continue in force and effect from and after the Effective Date until terminated by (1) operation of law, (2) unanimous consent of the parties, or (3) abandonment of the Project and a determination by the Monitoring Committee that all adverse impacts have been fully eliminated or mitigated as provided in this MOU.

7. Complete Agreement/Incorporation Into Banking Agreements. This MOU constitutes the whole and complete agreement of the parties regarding Project operation, maintenance and monitoring (amending and replacing the original MOU between the parties regarding Rosedale's Groundwater Banking Program). Rosedale shall incorporate this MOU by reference into any further agreement it enters into respecting banking of water in or withdrawal of water from the Project Site.

8. Future Projects. With respect to any future project within the Kern Fan Area, the Parties hereto shall use good faith efforts to negotiate an agreement substantially similar in substance to this MOU.

9. Notice Clause. All notices required by this MOU shall be sent via first class United States mail to the addresses shown on the signature page of this agreement and shall be deemed delivered three days after deposited in the mail. Notice of changes in the representative or address of a party shall be given in the same manner.

10. California Law Clause. All provisions of this MOU and all rights and obligations of the parties hereto shall be interpreted and construed according to the laws of the State of California.

11. Amendments. This MOU may be amended by written instrument executed by all of the parties. In addition, recognizing that the parties may not now be able to contemplate all the implications of the Project, the parties agree that on the tenth anniversary of implementation of the Project, if facts and conditions not envisioned at the time of entering into this MOU are present, the parties will negotiate in good faith amendments to this MOU. If the parties cannot

agree on whether conditions have changed necessitating an amendment and/or upon appropriate amendments to the MOU, such limited issues shall be submitted to an arbitrator or court, as the case may be, as provided above.

12. Successors and Assigns. This MOU shall bind and inure to the benefit of the successors and assigns of the parties.

13. Severability. The rights and privileges set forth in this MOU are severable and the failure or invalidity of any particular provision of this MOU shall not invalidate the other provisions of this MOU; rather all other provisions of this MOU shall continue and remain in full force and effect notwithstanding such partial failure or invalidity.

14. Force Majeure. All obligations of the parties shall be suspended for so long as and to the extent the performance thereof is prevented, directly or indirectly, by earthquakes, fires, tornadoes, facility failures, floods, drownings, strikes, other casualties, acts of God, orders of court or governmental agencies having competent jurisdiction, or other events or causes beyond the control of the parties. In no event shall any liability accrue against a party, or its officers, agents or employees, for any damage arising out of or connected with a suspension of performance pursuant to this paragraph.

15. Counterparts. This MOU, and any amendment or supplement thereto, may be executed in two or more counterparts, and by each party on a separate counterpart, each of which, when executed and delivered, shall be an original and all of which together shall constitute one instrument, with the same force and effect as though all signatures appeared on a single document. In proving this MOU or any such amendment, supplement, document or

instrument, it shall not be necessary to produce or account for more than one counterpart thereof signed by the party against whom enforcement is sought.

IN WITNESS WHEREOF the parties have executed this MOU the day and year first above written at Bakersfield, California.

ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT
P. O. Box 867
Bakersfield, CA 93302-0867

By:_____

By:_____

WEST KERN WATER DISTRICT
800 Kern Street
P. O. Box 1105
Taft, CA 93268-1105

By:_____

By:_____

SEMITROPIC WATER STORAGE DISTRICT
P. O. Box Z
Wasco, CA 93280-0877

By:_____

By:_____

BUENA VISTA WATER STORAGE DISTRICT
P. O. Box 756
Buttonwillow, CA 93206

By:_____

By:_____

HENRY MILLER WATER DISTRICT
P. O. Box 9759
Bakersfield, CA 93389-9759

By:_____

By:_____

KERN WATER BANK AUTHORITY
P. O. Box 80607
Bakersfield, CA 93380-0607

By:_____

By:_____

KERN COUNTY WATER AGENCY
P. O. Box 58
Bakersfield, CA 93302-0058

By:_____

By:_____

IMPROVEMENT DISTRICT NO. 4
P. O. Box 58
Bakersfield, CA 93302-0058

By:_____

By:_____

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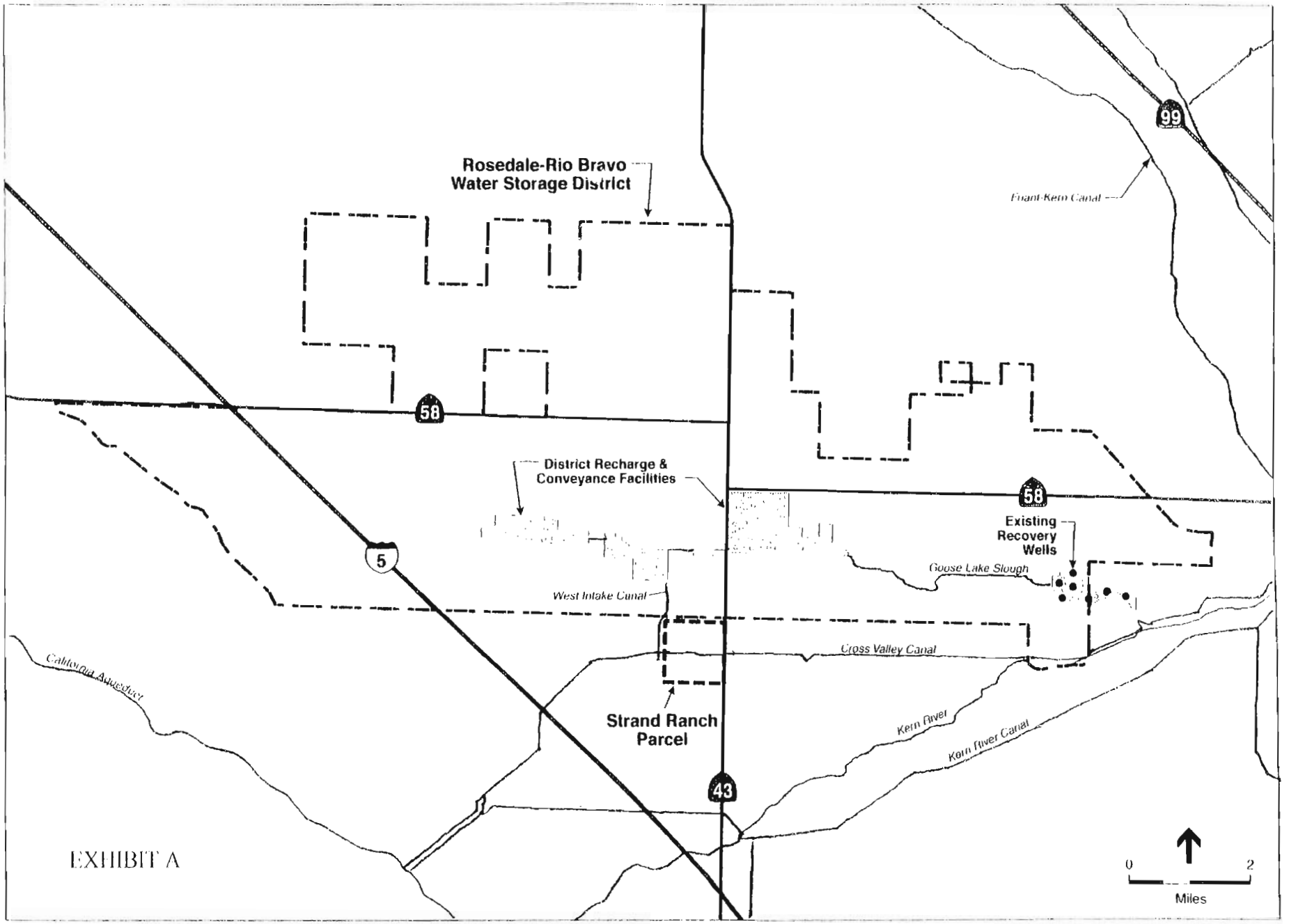

Rosedale-Rio Bravo
Water Storage District
Friant-Kern Canal
99
58
District Recharge &
Conveyance Facilities
58
Existing
Recovery
Wells
5
Goose Lake Slough
West Intake Canal
Cross Valley Canal
California Aqueduct
Strand Ranch
Parcel
Kern River
Kern River Canal
43
0
2
Miles

EXHIBIT A

EXHIBIT B

PROJECT DESCRIPTION

Purposes

The primary water management objective of Rosedale-Rio Bravo Water Storage District is to enhance water supplies for its landowners. One method of attaining this goal is to sponsor third party banking programs. Under such programs surface water will be stored in aquifers during times of surplus and either recovered during times of shortage or remain in the ground to assist with overdraft correction.

Sources of Water

Kern River water, being Rosedale-Rio Bravo WSD's primary supply water right, as well as other sources will be recharged. Such sources include: the Kern River, Friant-Kern, SWP, CVP, flood water and other sources that may be available from time to time.

Facilities

To achieve its water management objectives through third party banking programs, the Rosedale-Rio Bravo Water Storage District may require the construction of recharge ponds, water conveyance facilities, and water wells in addition to its existing facilities.

Of the approximately 43,000 acres that presently constitute Rosedale-Rio Bravo Water Storage District all may be used for in-lieu and/or direct recharge. In addition, adjacent lands within non-districted areas may also be used for in-lieu and direct recharge. It is anticipated that in the wettest of years as much as 300,000 acre-feet can be recharged.

It is proposed that water would be conveyed to and from the property using available capacity in any of the canals and conveyance facilities that may serve the property including: the Cross Valley Canal, the Kern River, the Friant Kern Canal, the California Aqueduct, and the Goose Lake Slough. It is also proposed to build additional conveyance facilities as future projects are developed.

As many as 20 wells may be added within the District boundaries before the project is complete to provide adequate recovery capacity and the necessary operational flexibility to avoid or minimize adverse impacts. District/Landowner programs may include the use of landowner wells by District wide reduction in surface supply allocations or by individual volunteer well lease programs. Once build out of the recovery facilities is complete, the recovery capacity will be maintained by constructing new wells to replace the capacity of older wells as they fail. New District owned wells shall be placed no closer than 880 feet from property and/or District boundaries. Wells inside the District boundaries shall be located and operated so as to prevent significant non-mitigable adverse impacts to neighboring landowners.

Operation

The project shall be managed by the Rosedale-Rio Bravo Water Storage District. Day-to-day operation of portions of the project may be contracted to other parties. Operation of the project shall be coordinated with adjoining projects. The total storage capacity intended to be utilized at any one time for banking project purposes is 500,000 AF and the total recovery capacity intended to be utilized for banking project purposes is 63,250 AF/year.

Banking Projects

The project includes all third party banking programs whether pending or completed. These

programs include, without limitation, the following:

ROSEDALE CONJUNCTIVE USE PROGRAM PARTNERSHIP AGREEMENTS

Banking Partner	Type	Annual Recharge (af)	Maximum Return Obligation (afy)	Maximum Storage (af)	Banked Water Source
Arvin-Edison WSD (draft terms)	2:1 Banking	30,000	10,000	90,000	CVP
Kern-Tulare/Rag Gulch WD	2:1 Banking	20,000	7,500	50,000	varies
Castaic Lake Water Agency	Banking	20,000	20,000*	100,000	varies
Buena Vista WSD	Banking	80,000	8,250	200,000	Kern River
Irvine Ranch Water District	Banking	17,500	17,500	50,000	varies
TOTAL			63,250	490,000	

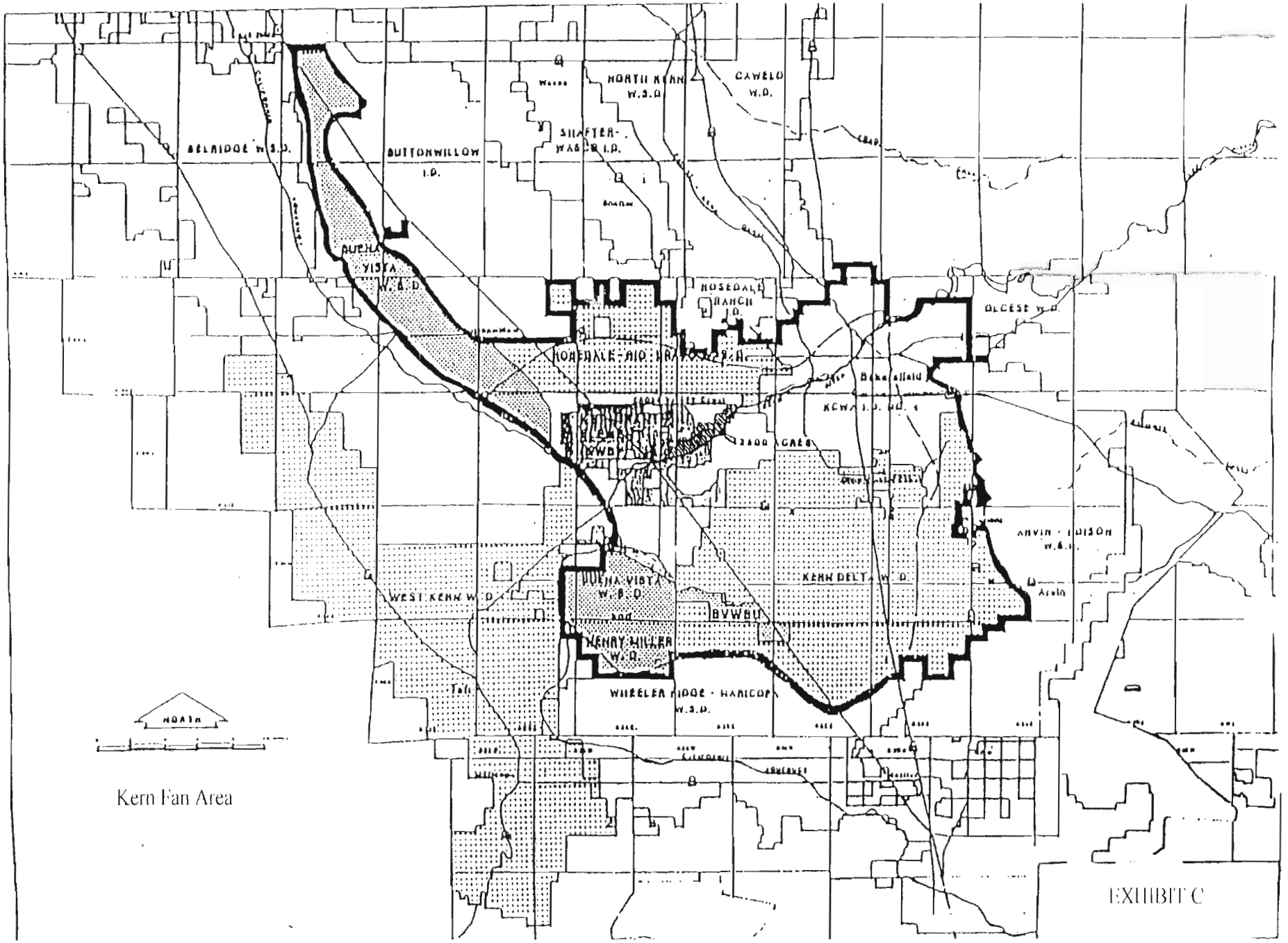
*surplus capacity of existing wells

A detailed description of each program is found in the environmental documentation relating thereto which includes, without limitation, the following: (1) Master EIR for Groundwater Storage, Banking, Exchange, Extraction and Conjunctive Use Program, certified July 17, 2001; (2) Addendum No. 1 to Master EIR, adopted in 2003; (3) FEIR for the BVWSD/RRBWSD Water Banking and Recovery Program, certified October 11, 2002; (4) Negative Declaration for Kern Tulare Program; (5) Negative Declaration for Groundwater Banking - Allen Road Wellfield (AEWSD) Program; and (6) FEIR for the Strand Ranch Integrated Banking Project (IRWD), certified May 27, 2008.

Addenda

(1) Notwithstanding paragraph 2.b.(10)(a) of this agreement, the surface recharge losses for the Strand Ranch property shall be fixed and assessed at a rate of 6% whether the recharge is intended for in-district or out-of-district use; provided, however, such 6% loss may be modified in the future if studies acceptable to the parties demonstrate that such modification is appropriate; provided further, however, that a 1% safety factor shall be maintained and the total loss when directly recharged water is extracted for out-of-district use shall not exceed 6%.

(2) It is understood and agreed by and among all parties that issues involving project operations may be presented to and addressed by the Monitoring Committee whether or not such issues were discussed, reviewed and/or considered during the environmental evaluation of the project.


NORTH KERN W.S.D.
CAWELO W.D.
BELRIDGE W.S.D.
BUTTONWILLOW I.D.
SHAFTER-WASCO I.D.
BUENA VISTA W.S.D.
ROSEDALE RANCH I.D.
ROSEDALE-RIO BRAVO W.S.D.
BOLTHOUSE W.D.
KCWA I.D. NO. 4
2800 ACRE
RVWD
ARVIN-EDISON W.S.D.
KERN DELTA W.D.
WEST KERN W.D.
BUENA VISTA W.S.D.
BVWBU
HENRY MILLER W.D.
WHEELER RIDGE - MARICOPA W.S.D.
NORTH
Kern Fan Area
EXHIBIT C

April 30, 2004

Mr. Hal Crossley, General Manager
Rosedale-Rio Bravo Water Storage District
P.O. Box 867
Bakersfield, CA 93302

Re: Memorandum of Understanding, Rosedale-Rio Bravo Water Storage District Groundwater Banking and Sale Program

Dear Mr. Crossley:

Enclosed please find executed copies of the above-referenced Memorandum of Understanding. It is our understanding that this MOU does not in any way modify or amend our letter agreement regarding the banking and sales programs dated December 1, 2003. Please acknowledge that this is also your understanding by signing the acknowledgement below and returning a copy of this letter.

Sincerely,

Thomas N. Clark
General Manager

Being authorized by the district, we agree to the foregoing.

Hal Crossley

Rosedale-Rio Bravo Water Storage District
By Hal Crossley, General Manager
Dated: May 10, 2004

661/634-1400

Mailing Address
P.O. Box 58
Bakersfield, CA 93302-0058

Street Address
3200 Rio Mirada Dr.
Bakersfield, CA 93308

MEMORANDUM OF UNDERSTANDING

REGARDING OPERATION AND MONITORING OF THE ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT GROUNDWATER BANKING AND SALE PROGRAM

This Memorandum of Understanding is entered into the Effective Date hereof by and among **ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT**, hereinafter referred to as "Rosedale", and **ROSEDALE RANCH I.D. OF NORTH KERN WATER STORAGE DISTRICT, SEMITROPIC WATER STORAGE DISTRICT, BUENA VISTA WATER STORAGE DISTRICT, HENRY MILLER WATER DISTRICT, BERRENDA MESA WATER DISTRICT, KERN COUNTY WATER AGENCY, KERN WATER BANK AUTHORITY, IMPROVEMENT DISTRICT NO. 4 KERN COUNTY WATER AGENCY, and WEST KERN WATER DISTRICT**, collectively referred to as "Adjoining Entities."

R E C I T A L S

WHEREAS, Rosedale expects that certain real property more particularly shown on the map attached hereto as Exhibit A and incorporated herein by this reference ("Project Site"), or portions thereof, will be used in connection with the Project; and

WHEREAS, Rosedale intends to develop and improve the Project Site as necessary to permit the importation, percolation and storage of water in underground aquifers for later recovery, transportation and use for the benefit of Rosedale, all as more fully described in Exhibit B attached hereto and incorporated herein by this reference ("Project"); and

WHEREAS, Adjoining Entities encompass lands and/or operate existing projects lying adjacent to the Project Site as shown on said Exhibit A; and

WHEREAS, in recent years, water banking, recovery and transfer programs in Kern County have become increasingly numerous and complex; and

WHEREAS, it is appropriate and desirable to mitigate or eliminate any short-term and long-term significant adverse impacts of new programs upon potentially affected projects and landowners within the boundaries of Adjoining Entities; and

WHEREAS, Adjoining Entities and Rosedale desire that the design, operation and monitoring of the Project be conducted and coordinated in a manner to insure that the beneficial effects of the Project to Rosedale are maximized but that the Project does not result in significant adverse impacts to water levels, water quality or land subsidence within the boundaries of Adjoining Entities, or otherwise interfere with the existing and ongoing programs of Adjoining Entities; and

WHEREAS, on October 26, 1995, the Kern Water Bank Authority and its Member Entities, as the "Project Participants," and Buena Vista Water Storage District, Rosedale-Rio Bravo Water Storage District, Kern Delta Water District, Henry Miller Water District and West Kern Water District, as the "Adjoining Entities," entered into a Memorandum of Understanding, similar to this Memorandum of Understanding, which provided among other things at Paragraph 8 that for "any future project within the Kern Fan Area, the Parties hereto shall use good faith efforts to negotiate an agreement substantially similar in substance to this MOU," and by entering into this MOU the Adjoining Entities find that this MOU satisfies such requirement for the Project; and

WHEREAS, Rosedale intends to operate its Project such that the same does not cause or contribute to overdraft of the groundwater basin; and

WHEREAS, in connection with its environmental review for the Project, Rosedale commissioned a hydrologic balance study for a period of years, which study shows that the District is not currently operating in a state of overdraft, and, further, Rosedale has projected said hydrologic balance study into the future, assuming completion of the Project, and said projection demonstrates that the District is not expected to operate in state of overdraft following implementation of the Project, which studies have not been independently verified by the Adjoining Entities; and

WHEREAS, in the hydrologic balance studies conducted by Rosedale in connection with the Project, the annual safe yield from the groundwater basin is assumed to be .3 acre-feet per acre times the gross developed acres in the District and no assumption is included with respect to groundwater inflow or outflow; and

WHEREAS, this MOU affects the Project and other similar banking programs operated for the benefit of third parties.

NOW, THEREFORE, BE IT RESOLVED that, based upon the mutual covenants contained herein, the parties hereto agree as follows:

1. Project Design and Construction. Rosedale has completed a preliminary Project Description of the Project described in Exhibit B hereto representing the contemplated facilities for the Project. Said preliminary description has been reviewed by the parties hereto. The foregoing shall not be interpreted to imply consent to any aspect of any future project not described in existing approved environmental documentation. Rosedale will construct the Project consistent with such preliminary description. Any major modifications of the facilities and/or significant changes from that described in Exhibit B and in the environmental documentation for the Project will be subject to

additional environmental review pursuant to CEQA and will be subject to review of the Monitoring Committee prior to implementation.

2. Project Operation. The Project shall be operated to achieve the maximum water storage and withdrawal benefits for Rosedale consistent with avoiding, mitigating or eliminating to the greatest extent practicable, significant adverse impacts resulting from the Project. To that end, the Project shall be operated in accordance with the following Project Objectives and Minimum Operating Criteria:

a. Project Objectives. Consistent with the Project description, Rosedale will make a good faith effort to meet the following objectives, which may or may not be met:

(1) The parties should operate their projects in such manner as to maintain and, when possible, enhance the quality of groundwater within the Project Site and the Kern Fan Area as shown in Exhibit C.

(2) If supplies of acceptable recharge water exceed recharge capacity, all other things being equal, recharge priority should be given to the purest or best quality water.

(3) Each project within the Kern Fan Area should be operated with the objective that the average concentration of total dissolved salts in the recovered water will exceed the average concentration of total dissolved salts in the recharged water, at a minimum, by a percentage equal to or greater than the percentage of surface recharge losses. The average shall be calculated from the start of each project.

(4) To maintain or improve groundwater quality, recovery operations should extract poorer quality groundwater where practicable. Blending may be used to increase recovery of lesser quality groundwater unless doing so will exacerbate problems by generating

unfavorable movement of lesser quality groundwater. It is recognized that the extent to which blending can help to resolve groundwater quality problems is limited by regulatory agency rules regarding discharges into conveyance systems used for municipal supplies, which may be changed from time to time.

(5) All groundwater pumpers should attempt to control the migration of poor quality water. Extensive monitoring will be used to identify the migration of poor quality water and give advance notice of developing problems. Problem areas may be dealt with by actions including, but not limited to:

(a) limiting or terminating extractions that tend to draw lesser quality water toward or into the usable water areas;

(b) increasing extractions in areas that might generate a beneficial, reverse gradient;

(c) increasing recharge within the usable water area to promote favorable groundwater gradients.

(6) It is intended that all recovery of recharged water be subject to the so-called "golden rule." In the context of a banking project, the "golden rule" means that, unless acceptable mitigation is provided, the banker may not operate so as to create conditions that are worse than would have prevailed absent the project giving due recognition to the benefits that may result from the project, all as more fully described at paragraph 2(b)12 below.

(7) The Project shall be developed and operated so as to prevent, eliminate or mitigate significant adverse impacts. Thus, the Project shall incorporate mitigation measures as necessary. Mitigation measures to prevent significant adverse impacts from occurring include but

are not limited to the following: (i) spread out recovery area; (ii) provide buffer areas between recovery wells and neighboring overlying users; (iii) limit the monthly, seasonal, and/or annual recovery rate; (iv) provide sufficient recovery wells to allow rotation of recovery wells or the use of alternate wells; (v) provide adequate well spacing; (vi) adjust pumping rates or terminate pumping to reduce impacts, if necessary; (vii) impose time restrictions between recharge and recovery to allow for downward percolation of water to the aquifer; and (viii) provide recharge of water that would otherwise not recharge the Kern Fan Basin. Mitigation measures that compensate for unavoidable adverse impacts include but are not limited to the following: (i) with the consent of the affected groundwater pumper, lower the pump bowls or deepen wells as necessary to restore groundwater extraction capability to such pumper; (ii) with the consent of the affected groundwater pumper, provide alternative water supplies to such pumper; and (iii) with the consent of the affected groundwater pumper, provide financial compensation to such pumper.

b. Minimum Operating Criteria.

(1) The Monitoring Committee shall be notified prior to the recharge of potentially unacceptable water, such as "produced water" from oilfield operations, reclaimed water, or the like. The Monitoring Committee shall review the proposed recharge and make recommendations respecting the same as it deems appropriate. Where approval by the Regional Water Quality Control Board is required, the issuance of such approval by said Board shall satisfy this requirement.

(2) Recharge may not occur in, on or near contaminated areas, nor may anyone spread in, on or near an adjoining area if the effect will be to mound water near enough to the contaminated area that the contaminants will be picked up and carried into the uncontaminated

groundwater supply. When contaminated areas are identified within or adjacent to the Project, Rosedale shall also:

(a) participate with other groundwater pumpers to investigate the source of the contamination;

(b) work with appropriate authorities to ensure that the entity or individual, if any, responsible for the contamination meets its responsibilities to remove the contamination and thereby return the Project Site to its full recharge and storage capacity;

(c) operate the Project in cooperation with other groundwater pumpers to attempt to eliminate the migration of contaminated water toward or into usable water quality areas.

(3) Operators of projects within the Kern Fan Area will avoid operating such projects in a fashion so as to significantly diminish the natural, normal and unavoidable recharge of water native to the Kern Fan Area as it existed in pre-project condition. If and to the extent this occurs as determined by the Monitoring Committee, the parties will cooperate to provide equivalent recharge capacity to offset such impact.

(4) The mitigation credit for fallowed Project land shall be .3 acre-feet per acre per year times the amount of fallowed land included in the Project Site in the year of calculation.

(5) The lands shown in Exhibit A may be utilized for any purpose provided, however, the use of said property by Rosedale for the Project shall not cause or contribute to overdraft of the groundwater basin.

(6) Each device proposed to measure recharge water to be subsequently recovered and/or recovery of such water will be initially evaluated and periodically reviewed by the

Monitoring Committee. Each measuring device shall be properly installed, calibrated, rated, monitored and maintained by and at the expense of the owner of the measuring device.

(7) It shall be the responsibility of the user to insure that all measuring devices are accurate and that the measurements are provided to the Monitoring Committee at the time and in the manner required by the Monitoring Committee.

(8) A producer's flow deposited into another facility, such as a transportation canal, shall be measured into such facility by the operator thereof and the measurement reported to the Monitoring Committee at the time and in the manner required by such Monitoring Committee.

(9) The Monitoring Committee or its designee will maintain official records of recharge and recovery activities, which records shall be open and available to the public. The Monitoring Committee will have the right to verify the accuracy of reported information by inspection, observation or access to user records (i.e., P.G.&E. bills). The Monitoring Committee will publish or cause to be published annual reports of operations.

(10) Losses shall be assessed as follows:

(a) Surface recharge losses shall be fixed and assessed at a rate of 3%, which includes a "safety factor" of 1% of water diverted for direct recharge. An additional surface recharge loss of 3% shall be fixed and assessed against water directly recharged which is subsequently extracted for out-of-district use. Such initial 3% loss may be modified in the future if studies acceptable to the parties demonstrate that such modification is appropriate, providing that a 1% "safety factor" shall be maintained and the total loss when directly recharged water is subsequently extracted for out-of-district use shall not exceed 6%. Notwithstanding anything to the

contrary provided herein, water banked in Rosedale for or on behalf of third parties (~~i.e.~~, creating a third party bank account) shall be subject to surface recharge losses calculated at 6% of water diverted for direct recharge.

(b) To account for all other actual or potential losses (including migration losses), a rate of 4% of water placed in a bank account shall be deducted to the extent that Rosedale has been compensated within three (3) years following the end of the calendar year in which the water was designated as banked at the SWP Delta Water Rate charged by DWR at the time of payment; provided further, however, that the water purchased and subtracted from a groundwater bank account pursuant to this provision shall only be used for overdraft correction within the District purchasing the water.

(c) An additional 5% loss shall be assessed against any water diverted to the Project Site for banking by, for, or on behalf of any out-of-County person, entity or organization (except current SWP Agricultural Contractors).

(d) All losses provided for herein represent amounts of water that are non-bankable and non-recoverable by Rosedale.

(11) Recovery of banked water shall be from the Project Site and recovery facilities shall be located therein. Recovery from outside the Project Site may be allowed with the consent of the District or entity having jurisdiction over the area from which the recovery will occur and upon review by the Monitoring Committee.

(12) Recovery of banked water may not be allowed if not otherwise mitigated if it will result in significant adverse impacts to surrounding overlying users. "Adverse impacts" will be evaluated using data applicable in zones including the area which may be affected

by the Project of approximately five miles in width from the boundaries of the Project as designated by the Monitoring Committee. In determining "adverse impacts," as provided at this paragraph and elsewhere in this MOU, consideration will be given to the benefits accrued over time during operation of the Project to landowners surrounding the Project Site including higher groundwater levels as a result of operation of the Project. In determining non-Project conditions vs. Project conditions, credit toward mitigation of any otherwise adverse impacts shall be recognized to the extent of the 4% loss and 5% losses recognized under paragraphs 2.b.(10)(b) and (c), for the mitigation credit recognized under paragraph 2.b.(4), if any, and to the extent of recharge on the Project Site for overdraft correction.

(13) To the extent that interference, other than insignificant interference, with the pumping lift of any existing active well as compared to non-Project conditions, is attributable to pumping of any wells on the Project Site, Rosedale will either stop pumping as necessary to mitigate the interference or compensate the owner for such interference, or any combination thereof. The Monitoring Committee will establish the criteria necessary to determine if well interference, other than insignificant interference, is attributable to pumping of Project wells by conducting pumping tests of Project wells following the installation of monitoring wells (if not already completed) and considering hydrogeologic information.

(14) The Kern Fan Element Groundwater Model, with input from Rosedale and the Adjoining Entities, and utilizing data from a comprehensive groundwater monitoring program, may be used by the Monitoring Committee as appropriate to estimate groundwater impacts of the Project.

(15) The parties recognize that the Project shall be operated with a positive balance, i.e., there shall be no "borrowing" of water for recovery from the basin.

3. Project Monitoring. Adjoining Entities agree to participate in a comprehensive monitoring program and as members of a Monitoring Committee, as hereinafter more particularly described, in order to reasonably determine groundwater level and water quality information under Project and non-Project conditions. The monitoring program will more particularly require the following:

a. Monitoring Committee: Rosedale and the Adjoining Entities shall form a Monitoring Committee for the Project upon terms and conditions acceptable to the participants. The Monitoring Committee shall:

(1) Engage the services of a suitable independent professional groundwater specialist who shall, at the direction of the Committee, provide assistance in the performance of the tasks identified below;

(2) Meet and confer monthly or at other intervals deemed to be appropriate in furtherance of the monitoring program;

(3) Establish a groundwater evaluation methodology or methodologies;

(4) Prepare a monitoring plan and two associated maps, "Well Location, Water Quality Network," and "Well Location, Water Level Network," which plan and maps depict the location and types of wells anticipated to be used in the initial phase of groundwater monitoring (said plan and maps are expected to be modified from time to time as the monitoring program is developed and operated);

(5) Specify such additional monitoring wells and ancillary equipment as are deemed to be necessary or desirable for the purposes hereof;

(6) Prepare annual water balance studies and other interpretive studies, which will designate all sources of water and the use thereof within the study area;

(7) Develop criteria for determining whether excessive mounding or withdrawal is occurring or is likely to occur in an area of interest;

(8) Annually or as otherwise needed determine the impacts of the Project on each of the Adjoining Entities by evaluating with and without Project conditions; and

(9) Develop procedures, review data, and recommend Project operational criteria for the purpose of identifying, verifying, avoiding, eliminating or mitigating, to the extent practicable, the creation of significant imbalances or significant adverse impacts.

b. Collection and Sharing of Data. The Adjoining Entities will make available to the Monitoring Committee copies of all relevant groundwater level, groundwater quality, and other monitoring data currently collected and prepared by each. Rosedale shall annually report, by areas of interest, water deliveries for banking and other purposes, groundwater withdrawals from bank accounts, transfers and other changes in account balances.

c. Monitoring Costs.

(1) The cost of constructing monitoring wells and ancillary equipment within Rosedale shall be borne by Rosedale. The cost of any new or additional monitoring wells and ancillary equipment outside the boundaries of Rosedale shall be borne as may be determined by separate agreement of Rosedale and Adjoining Entities.

(2) Each of the parties shall be responsible for the personnel costs of its representative on the Monitoring Committee. In addition, the Adjoining Entities shall be responsible for all costs of monitoring operations and facilities within their respective boundaries and Rosedale shall be responsible for all costs of monitoring operations and facilities within the Project Site.

(3) All other groundwater monitoring costs, including employment of the professional groundwater specialist, collection, evaluation and analyses of data as adopted by the Monitoring Committee, shall be allocated among and borne by the parties as they shall agree among themselves. Cost sharing among Adjoining Entities shall be as agreed by them. Any additional monitoring costs shall be determined and allocated by separate agreement of those parties requesting such additional monitoring.

4. Modification of Project Operations. The Monitoring Committee may make recommendations to Rosedale, including without limitation recommendations for modifications in Project operations based upon evaluation(s) of data which indicate that excessive mounding or withdrawal is occurring or is likely to occur in an area of interest. The Monitoring Committee and its members shall not act in an arbitrary, capricious or unreasonable manner.

5. Dispute Resolution.

a. Submission to Monitoring Committee. All disputes regarding the operation of the Project or the application of this MOU, or any provision hereof, shall first be submitted to the Monitoring Committee for review and analysis. The Monitoring Committee shall meet and review all relevant data and facts regarding the dispute and, if possible, recommend a fair and equitable resolution of the dispute. The Monitoring Committee and its members shall not act in an arbitrary, capricious or unreasonable manner. In the event that (1) the Monitoring Committee fails to act as

herein provided, (2) any party disputes the Monitoring Committee's recommended resolution or (3) any party fails to implement the Monitoring Committee's recommended resolution within the time allowed, any party to this MOU may seek any legal or equitable remedy available as hereinafter provided.

b. Arbitration. If all of the parties agree that a factual dispute exists regarding any recommendation of the Monitoring Committee made pursuant hereto, or implementation thereof, such dispute shall, be submitted to binding arbitration before a single neutral arbitrator appointed by unanimous consent and, in the absence of such consent, appointed by the presiding judge of the Kern County Superior Court. The neutral arbitrator shall be a registered civil engineer, registered geologist, or other person agreeable to the parties, preferably with a background in groundwater hydrology. The arbitration shall be called and conducted in accordance with such rules as the contestants shall agree upon, and, in the absence of such agreement, in accordance with the procedures set forth in California Code of Civil Procedure section 1282, et seq. Any other dispute may be pursued through a court of competent jurisdiction as otherwise provided by law.

c. Burden of Proof. In the event of arbitration or litigation under this MOU, all parties shall enjoy the benefit of such presumptions as are provided by law but, in the absence thereof, neither party shall bear the burden of proof on any contested legal or factual issue.

d. Landowner Remedies. Nothing in this MOU shall prevent any landowner within the boundaries of any party from pursuing any remedy at law or in equity in the event such landowner is damaged as a result of projects within the Kern Fan Area.

6. Term. The Effective Date of this MOU shall be January 1, 2003 regardless of the date of actual execution. This MOU shall continue in force and effect from and after the Effective Date

until terminated by (1) operation of law, (2) unanimous consent of the parties, or (3) abandonment of the Project and a determination by the Monitoring Committee that all adverse impacts have been fully eliminated or mitigated as provided in this MOU.

7. Complete Agreement/Incorporation Into Banking Agreements. This MOU constitutes the whole and complete agreement of the parties regarding Project operation, maintenance and monitoring. Rosedale shall incorporate this MOU by reference into any further agreement it enters into respecting banking of water in or withdrawal of water from the Project Site.

8. Future Projects. With respect to any future project within the Kern Fan Area, the Parties hereto shall use good faith efforts to negotiate an agreement substantially similar in substance to this MOU.

9. Notice Clause. All notices required by this MOU shall be sent via first class United States mail to the addresses shown on the signature page of this agreement and shall be deemed delivered three days after deposited in the mail. Notice of changes in the representative or address of a party shall be given in the same manner.

10. California Law Clause. All provisions of this MOU and all rights and obligations of the parties hereto shall be interpreted and construed according to the laws of the State of California.

11. Amendments. This MOU may be amended by written instrument executed by all of the parties. In addition, recognizing that the parties may not now be able to contemplate all the implications of the Project, the parties agree that on the tenth anniversary of implementation of the Project, if facts and conditions not envisioned at the time of entering into this MOU are present, the parties will negotiate in good faith amendments to this MOU. If the parties cannot agree on whether conditions have changed necessitating an amendment and/or upon appropriate amendments to the

MOU, such limited issues shall be submitted to an arbitrator or court, as the case may be, as provided above.

12. Successors and Assigns. This MOU shall bind and inure to the benefit of the successors and assigns of the parties.

13. Severability. The rights and privileges set forth in this MOU are severable and the failure or invalidity of any particular provision of this MOU shall not invalidate the other provisions of this MOU; rather all other provisions of this MOU shall continue and remain in full force and effect notwithstanding such partial failure or invalidity.

14. Force Majeure. All obligations of the parties shall be suspended for so long as and to the extent the performance thereof is prevented, directly or indirectly, by earthquakes, fires, tornadoes, facility failures, floods, drownings, strikes, other casualties, acts of God, orders of court or governmental agencies having competent jurisdiction, or other events or causes beyond the control of the parties. In no event shall any liability accrue against a party, or its officers, agents or employees, for any damage arising out of or connected with a suspension of performance pursuant to this paragraph.

15. Counterparts. This MOU, and any amendment or supplement thereto, may be executed in two or more counterparts, and by each party on a separate counterpart, each of which, when executed and delivered, shall be an original and all of which together shall constitute one instrument, with the same force and effect as though all signatures appeared on a single document. In proving this MOU or any such amendment, supplement, document or instrument, it shall not be necessary to produce or account for more than one counterpart thereof signed by the party against whom enforcement is sought.

IN WITNESS WHEREOF the parties have executed this MOU as of _____,

2004 (Effective Date) at Bakersfield, California.

ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT
P. O. Box 867
Bakersfield, CA 93302-0867

By: _____

By: _____

ROSEDALE RANCH I.D.
NORTH KERN WATER STORAGE DISTRICT
P. O. Box 81435
Bakersfield, CA 93380-1435

By: _____

By: _____

SEMITROPIC WATER STORAGE DISTRICT
P. O. Box Z
Wasco, CA 93280-0877

By: _____

By: _____

BUENA VISTA WATER STORAGE DISTRICT
P. O. Box 756
Buttonwillow, CA

By: _____

By: _____

HENRY MILLER WATER DISTRICT
P. O. Box 9759
Bakersfield, CA 93389-9759

By:_____

By:_____

BERRENDA MESA WATER DISTRICT
2100 F Street, Suite 100
Bakersfield, CA 93301

By:_____

By:_____

KERN COUNTY WATER AGENCY
P. O. Box 58
Bakersfield, CA 93302-0058

By: Gene A. Lundquist

By: President

KERN WATER BANK AUTHORITY
P. O. Box 80607
Bakersfield, CA 93380-0607

By:_____

By:_____

IMPROVEMENT DISTRICT NO. 4
KERN COUNTY WATER AGENCY
P. O. Box 58
Bakersfield, CA 93302-0058

By: Gene A. Lundquist

By: President

WEST KERN WATER DISTRICT
P. O. Box 1105
Taft, CA 93268-1105

By:_____

By:_____

RRB banking MOU - sales included - final.wpd

EXHIBIT 'A'

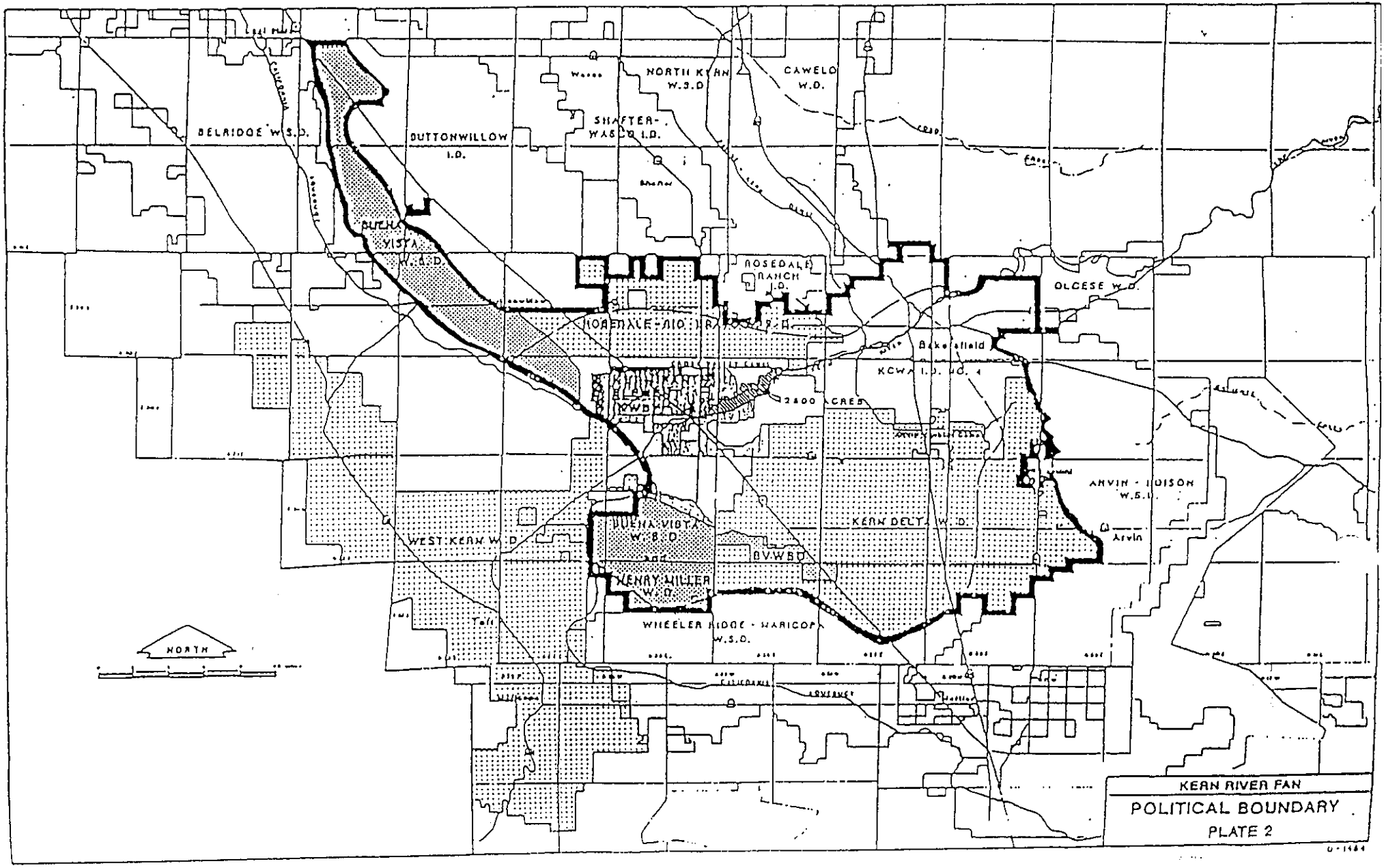

BELRIDGE W.S.D.
BUTTONWILLOW I.D.
NORTH KERN W.S.D
CAWELO W.D.
SHAFTER-WASCO I.D.
BUENA VISTA W.S.D.
ROSEDALE RANCH I.D.
OLCESE W.D.
ROSEDALE-HIGH RANCH W.D.
Bakersfield
KCWA I.D. NO. 4
2800 ACRE
BVWSD
ARVIN - EDISON W.S.D.
Arvin
KERN DELTA W.D.
WEST KERN W.D.
BUENA VISTA W.S.D.
BVWSD
HENRY MILLER W.D.
WHEELER RIDGE - MARICOPA W.S.D.
NORTH
KERN RIVER FAN
POLITICAL BOUNDARY
PLATE 2

EXHIBIT 'B'

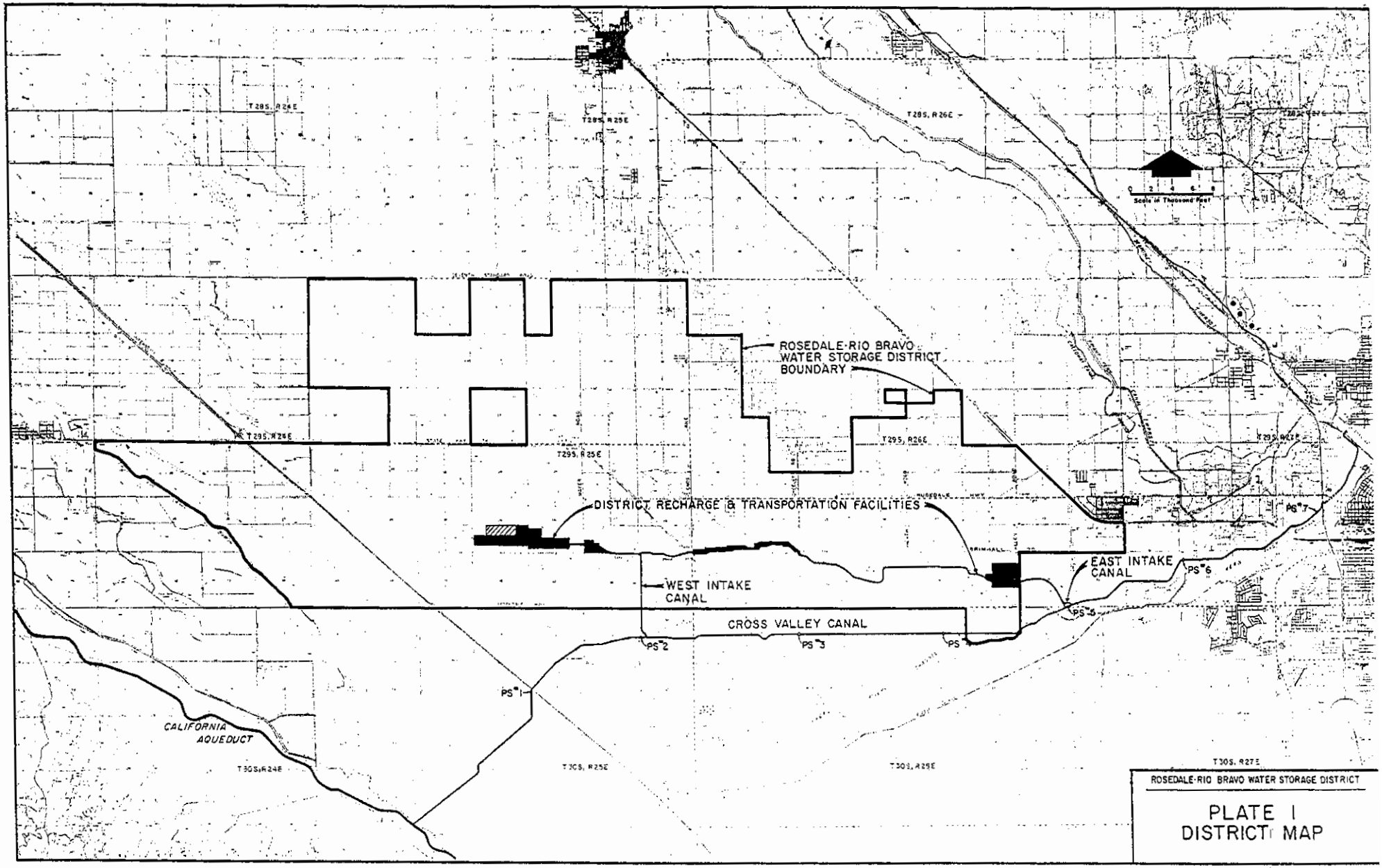
PROJECT DESCRIPTION

The Project involves the recharge, groundwater banking, recovery and sale of water by Rosedale-Rio Bravo Water Storage District (RRBWSD). Kern-Tulare Water District, Arvin-Edison Water Storage District (AEWSD) and other acquired waters will be captured and recharged within the RRBWSD service area. These recharged waters will be banked along with water previously recharged within the Kern River Fan Area by RRBWSD. Waters included in the banking program will originate from imported supplies that RRBWSD is able to put to beneficial use through direct or in-lieu recharge, or from captured local supplies that would have historically left Kern County, percolated into areas of poor quality or unusable groundwater, flooded agricultural land, or would otherwise not have been put to beneficial use within the groundwater basin.

RRBWSD has tentative agreement with Glorious Land Company (GLC). Said agreement calls for the sale and delivery of a total 220,000 acre-feet of water to GLC by RRBWSD over an initial term of 33 years (average 6,667 acre-feet per year). The maximum annual delivery at full build-out will not exceed 9,500 acre-feet. RRBWSD is negotiating a further agreement with The Metropolitan Water District of Southern California (MWD), which is expected to provide that MWD make actual annual deliveries to GLC and RRBWSD provide its water to MWD by way of exchange. Under the terms of the proposed MWD agreement, MWD may take direct delivery of water from RRBWSD annually or may choose to store water in RRBWSD. If and to the extent that the storage option is exercised, MWD will be limited to 60,000 acre-feet maximum storage at any one time and 20,000 acre-feet maximum annual delivery (which amount is inclusive of and not in addition to the 9,500 acre-feet maximum annual delivery provided in the letter of intent).

RRBWSD will improve District-owned lands in the South½ of Section 25, T29S, R25E, MDB&M to add approximately 80 net acres of additional recharge ponds for project purposes. RRBWSD will construct approximately 10 additional extraction wells (8 new and 2 replacement wells) in RRBWSD's west-side well field. A pipeline will be constructed to connect the wells to the District's system and the Cross Valley Canal. RRBWSD will acquire and improve additional lands to increase the District's recharge capacity to 600 cfs.

EXHIBIT 'C'



ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT

PLATE 1
DISTRICT MAP

LONG TERM PROJECT RECOVERY
OPERATIONS PLAN
REGARDING ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT PROJECTS

Purpose.

Consistent with Rosedale-Rio Bravo Water Storage District's (Rosedale) Memorandums of Understanding governing its banking projects (MOUs), this Long Term Operations Plan Regarding Rosedale-Rio Bravo Water Storage District Projects ("Plan") designates specific measures to be employed to *"... prevent, eliminate or mitigate significant adverse impacts"* resulting from project operations within areas of concern (AOC's). All Rosedale projects which are subject to an MOU with adjoining entities shall be subject to and operated consistent with this Plan. Rosedale will carry out its duties and responsibilities under this Plan in good faith and in cooperation with its landowners, to the end that the objectives and purposes of this Plan will be achieved and/or carried out to the greatest extent practicable.

Plan Components:

A. Establish a Protocol for Monitoring and Reporting Groundwater Conditions to the Board of Directors and the Public.

1. During years when Rosedale is recovering (or is expected to recover) groundwater from a Rosedale project, Rosedale will conduct monitoring of groundwater conditions, as necessary, in addition to the monitoring conducted by the Kern Fan Monitoring Committee (pursuant to the MOUs), and provide reports on groundwater levels as described below.
2. Rosedale will report current groundwater levels to its Board of Directors at each monthly regular meeting, and will make the reports available to the public on its website (http://www.rrbwsd.com/).
3. Rosedale will regularly update its Groundwater Model (Model) to actual conditions and use the Model to project future groundwater conditions. Rosedale will endeavor to use the best and latest science and information available in all modeling and technical matters. Rosedale will report the results of its modeling to its Board of Directors and will make the results available to the public on its website (http://www.rrbwsd.com/). Recovery in any calendar year shall not commence until the Model has been run for projected operations and the results have been reported to the Board and made available to the public.

B. Implement Proactive Measures (in addition to A. above).

1. Rosedale will be obligated to collect and/or contribute funds to meet mitigation obligations hereunder (**"Action Fund")**, which shall be initially set at $2.00/AF

of recovered water from all prospective project operations (actually pumped, not exchanged), until the Action Fund balance reaches $_____. If the Action Fund balance drops below $_____ contributions shall be resumed until the Action Fund balance again reaches $_____. In addition, Rosedale shall initially provide $50,000 to the Action Fund. Rosedale shall maintain an accounting of funds and shall serve as fiscal agent for the Action Fund; Rosedale shall report the balance of the fund to its Board of Directors at its regular monthly meetings.

2. Rosedale will use its Model as a tool to evaluate groundwater impacts resulting from its project operations. The Model will be periodically run and updated as projected recovery plans become known or change and the Model will assume such conditions.
3. The Model has been and will be used to:
   (a) Forecast groundwater levels.
   (b) Forecast and predict the contribution of Rosedale's projects to groundwater level declines in the area.
   (c) Determine water level conditions in the "No Project" Condition for purposes of evaluating the impact of project operations. The "No Project" condition is the water level that would have been at any particular well location absent the Rosedale project.
   (d) Identify, based upon an analysis of "No Project" and Project conditions, if a **negative project impact ("NPI")** has or is likely to occur for which the measures described at D, E, F and G may be operative. NPI is determined according to C., 2., below.
   (e) Forecast any localized areas for special attention and/or monitoring, i.e., AOC's.
   (f) Identify wells at risk of impacts during recovery operations.

C. Establish Triggers and Actions within any identified AOC.

As described below at sections D, E, F, and G, these actions will be implemented in consultation with affected landowners that make a claim to Rosedale of well impacts relating to Rosedale's recovery operations and groundwater level declines. The triggers and actions below are for wells within any identified AOC, subject to the following:

.

1. These actions would not occur in years when average water levels (measured at the following wells: 29S/25E-27N1&2, 29S/25E-25M1&2, 29S/26E-31H1&2, and 29S/25E-35G01) are less than 140 feet from the surface as measured on March 31 of each year because it is expected that water levels will not decline during such year to an extent resulting in adverse impacts to wells.
2. The trigger for whether mitigation is warranted shall be based upon an analysis

and comparison of Model generated "No Project" conditions to Model generated "Project" conditions. When the Project conditions are 30 feet deeper than the No Project conditions at an operative well, and the well has (or is expected to) experience mechanical failure or other operational problems due to declining water levels, a negative project impact ("NPI") is triggered.

3. It is the intent of Rosedale to mitigate and/or compensate for legitimate Project impacts; it is not the intent of the Rosedale or the Plan to generate a windfall for landowners. Accordingly, reasonable adjustments in the form or level of mitigation and/or compensation may be made where it can be demonstrated that the affected well requires remediation for reasons other than temporary groundwater level declines resulting from Project operations (i.e., general overdraft conditions, lack of well maintenance, normal wear and tear, failure of well equipment, casing degradation, etc.).

4. For a well owner to be eligible for mitigation as provided below, the affected landowner shall submit a claim to Rosedale, which shall, at a minimum, provide information concerning the condition of the well and casing and pumping equipment of the well, and other information that is relevant to the landowner's claim. Upon receipt of a claim, Rosedale shall use the Model (or the results of modelling as reported to the Board and the public) to determine whether an NPI exists at the landowner's well and respond with the appropriate action described below.

D. Action for Ag Wells – Well Adjustment Needed and Available

1. Trigger: When the Model predicts NPI for an operational ag well outside the current operating range of the pump but within the potential operating range of the well.
2. Actions:
   (a) Field verify (with the affected landowner if requested) static depth to groundwater levels within the well and compare to Model values.
   (b) Compare pump setting information with Model projected pumping water levels throughout the year to determine pump submergence levels and evaluate the necessity and feasibility of lowering the well pump to meet the landowner's needs.
   (c) Secure an estimate to complete the necessary work.
   (d) Using the Action Fund, pay all costs associated with the landowner claim, including the cost to complete the necessary work (less negotiated offsets), upon the landowner executing a release.

E. Action for Ag Wells – Well Adjustment Unavailable

1. Trigger: When the Model predicts NPI for an operational ag well outside the current and potential operating range of the well.
2. Action:
   (a) Field verify (with the affected landowner if requested) static depth to groundwater levels within the well and compare to Model values.
   (b) Supply equivalent water supply to the affected landowner from an alternate source at no greater cost to the affected landowner; or
   (c) With the consent of the affected landowner, provide other acceptable mitigation; or
   (d) Reduce or adjust pumping as necessary to prevent, avoid or eliminate the NPI. Use the Model(s) to identify the well or wells that may require reduction or adjustment in pumping.

F. Action for Domestic Wells.

1. Trigger: Emergency health and safety concerns exist because a domestic well production ceases or is likely to cease as a result of pumping by Rosedale's project.
2. Actions:
   (a) Field verify (with the affected landowner if requested) if flow stoppage is due to groundwater level decline.
   (b) Obtain right-of-entry permit and well data release from well owner.
   (c) Collect pump manufacture data, the in-situ pump setting and the casing depth information.
   (d) If it is determined that no NPI exists at the well, or if flow stoppage is due to causes unrelated to groundwater level decline (i.e., pump failure, casing degradation, etc.) repairs are the responsibility of the landowner.
   (d) If flow stoppage is due to groundwater level decline in the aquifer proximate to the impacted well and an NPI exists at the well, offer to fund from the Action Fund one of the following in order to provide the least cost short and long term solution:
      (1) Lower the domestic submersible pump bowl setting sufficient to restore and maintain service.
      (2) Provide a one-time permanent connection to the nearest water service provider.
      (3) Drill and equip a new domestic well, the cost of which may be subject to offset by the landowner based on betterment.
      (4) If necessary, provide interim in-home water supplies until action (1), (2) or (3) above is completed.
   (e) Using the Action Fund, pay all costs associated with the landowner claim, including the cost to complete the necessary work (less negotiated offsets), upon the landowner executing a release.

G. Action for Other Landowner Claims.

1. Trigger: A landowner makes a claim of impact on his groundwater use (which could be due to Rosedale's projects, adjacent landowners, or a combination) that does not relate to the actual (or likely) cessation of production at a well.
2. Actions:
   (a) Refer claim to the Board of Directors to evaluate and respond to landowner claim at its next regularly scheduled meeting.
   (b) Process claim according to agreed upon dispute resolution process (e.g., mediation, arbitration, etc.) in the event the affected landowner does not agree with the Board of Directors' response.

H. Release; Rosedale's Rights Against Others

In all instances when Rosedale takes action to mitigate the effects of declining groundwater levels under this Plan, the affected landowner shall be required to execute an appropriate release in favor of Rosedale. Nothing in this Plan or any action taken by Rosedale hereunder shall affect Rosedale's rights or remedies against any other person or entity (e.g., adjacent landowners, other recovery projects in the area and participants in such projects, etc.) which may have caused or contributed to the effects for which Rosedale has mitigated; if appropriate, an affected landowner that receives assistance from Rosedale hereunder shall assign its rights against such other person(s) or entity(ies) to Rosedale.

PROJECT RECOVERY OPERATIONS PLAN REGARDING PIONEER PROJECT, ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT, AND KERN WATER BANK AUTHORITY PROJECTS

Purpose:

The Kern County Water Agency, on behalf of itself and the Pioneer Project Recovery Participants, Rosedale- Rio Bravo Water Storage District, and the Kern Water Bank Authority (the Parties) have developed this Operating Plan to designate measures, consistent with the MOUs[1] governing their respective projects, to *"... prevent, eliminate or mitigate significant adverse impacts"* resulting from project recovery operations. This plan applies to all recovery programs undertaken by any of the Parties' projects that are governed by MOUs. Pioneer mitigation includes the Pioneer Project, Berrenda Mesa Banking Project and Improvement District No. 4's Allen Road well field. This plan applies to landowners using groundwater for overlying agricultural or domestic uses as of the date this plan is executed. It does not apply to wells installed after the date of this plan that are installed to unsuitable depths based on historic water level fluctuations.

Plan Components:

1. **Establish a Joint Operations Committee (JOC):**

   a. Representatives from each of the Parties will participate in the JOC. Each Party will have equal representation on the JOC and an equal voice in its determinations, except that with respect to claims made to the JOC, only those parties contributing to mitigation will have a vote in determinations made on such claims.

   b. The JOC will meet as needed during years in which recovery operations are occurring (or expected to occur) to evaluate groundwater conditions, model results, landowner claims, and any other topics of concern. It is expected that the JOC will meet at least monthly during years when recovery operations are occurring.

   c. The JOC may establish a technical subcommittee to assist with compiling information to use in evaluating claims.

   d. The JOC will evaluate all claims with respect to model results and other appropriate information and the triggers established in Section 3, and approve or reject such claims. If claims are approved, appropriate mitigation will be determined as further described in Section 3. If mitigation is provided, the JOC will fund and/or contribute to the actions as described in Section 4.

[1] MOU refers to all of those MOUs executed by the parties that contain terms substantially similar to the *Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program* (dated October 26, 1995).

2. Evaluate Groundwater Conditions

a. The Parties have developed groundwater models (AMEC and Harder) as a tool to evaluate With Project versus Without Project groundwater levels and predict potential groundwater impacts. The Parties shall mutually agree on the assumptions used for Without Project conditions, and for purposes of making determinations hereunder an average of the output for the two models shall be utilized. The Pioneer Without Project condition shall assume farming is continued on its footprint.

b. The models will be updated regularly (at least annually) and compared to actual conditions during years in which recovery occurs. The Parties shall mutually cooperate to attain all data necessary for such updates. The Parties will utilize the water quality and water level monitoring data collected by the Kern Fan Monitoring Committee, and may conduct additional monitoring as needed. The Parties will report the results of the modeling to their respective Boards of Directors and shall publish on their respective websites maps and data showing current and projected water level information in the general area of the projects. As a matter of practice, the Parties will use the best and latest science and information available in all modeling and technical matters.

c. Absent unanimous approval of the JOC, recovery in any calendar year beyond March 15 of that year shall not commence (or continue) until the Models have been run for the projected operations and the Committee has met to review the results.[2]

d. The Models will be used to:
   i. Forecast With Project and Without Project groundwater levels at the outset of recovery programs.
   ii. Forecast any localized areas for special attention and/or monitoring.
   iii. Attempt to identify domestic wells at risk of impacts.
   iv. Determine if mitigation triggers have been met (See Section 3b).

e. The Parties may, based on experience gained, select a mutually agreeable groundwater model capable of accurately predicting groundwater impacts resulting from project operations.

f. In case of a dispute concerning a technical issue with a model, such as data inputs or the results based thereon, the Parties shall consult with a third party to resolve the matter.

3. Triggers and Actions

a. These actions will not occur in years when average water levels (measured at the following wells: 29S/25E-25M1&2, 29S/26E-31H1&2, 29S/26E-34M1, and 29S/26E-35H) are less than 140 feet from the surface as measured on March 31 of a given year

[2] Model data for a preceding year becomes available at different times in the following year. Modeling at the beginning of any given year will necessitate estimating certain model input data for the preceding year (e.g. Kern River losses). These estimates will be replaced with actual data at regular intervals when the model is updated.

because it is expected that water levels will not decline during such year to an extent resulting in a mitigatable impact.

b. The trigger for whether mitigation is considered shall be based upon an analysis and comparison of Model generated Without Project conditions to Model generated With Project conditions. When the With Project conditions are fifteen (15) or forty-five (45) feet deeper than the Without Project conditions at any operative domestic or agricultural well, respectively, and mechanical failure or other operational problems have occurred or are reasonably likely to occur due to declining water levels, mitigation will be provided as described below.

c. To be eligible for mitigation as provided below, the affected landowner shall allow the JOC (or representatives thereof) to perform a field inspection as described in 3.d. below, and provide claim information concerning the condition of the well and casing and pumping equipment, as determined appropriate by the JOC. The JOC shall evaluate all submitted claims within forty-five (45) days of receipt, provided that the landowner cooperates with the collection of necessary information. All mitigation actions are contingent upon the claimant executing an appropriate release, the terms of which will depend upon the nature of the mitigation provided.

d. For all claims, a field inspection will be conducted with the consent and coordination of the landowner to determine static depth to groundwater levels within the well and verify well construction information and pump setting information, if possible.

e. Well construction information and pump setting information will be compared to Model projected pumping water levels to determine pump submergence levels and evaluate the necessity and feasibility of mitigation measures. Mitigation measures, if warranted, will include one or more of the following:
   i. Providing a short-term emergency water supply to domestic well owners. Short-term emergency supplies shall be provided as soon as reasonably possible, but in all cases within 14 days of notification to the JOC of such needs;
   ii. Providing funds to lower a well pump;
   iii. Providing funds to complete a connection to an M&I water provider;
   iv. Supplying an equivalent water supply from an alternate source;
   v. Providing funds to replace the affected well with a deeper well that meets Kern County well ordinance standards;
   vi. Reducing or adjusting recovery pumping as necessary to avoid the impact; or
   vii. With the consent of the affected landowner, providing other acceptable mitigation.

f. Mitigation will not be provided where it can be demonstrated that the affected well requires remediation for reasons other than temporary groundwater level declines resulting from Project operations (i.e., general overdraft conditions, lack of well maintenance, normal wear and tear, failure of well equipment, etc.).

4. **Mitigation Funding**

a. It is the intent of the Parties to mitigate and/or compensate for legitimate Project impacts; it is not the intent of the Parties or the Plan to generate a windfall for landowners. Accordingly, adjustments will be made for depreciation of existing equipment and landowner contributions based on betterment for all mitigation measures. See Exhibit A for an example of such adjustments.

b. All costs paid, water supplies provided, and/or pumping reductions used by the Parties to prevent, eliminate or mitigate claimed impacts at a well site shall be initially allocated among the parties according to their respective projects' proportionate contributions to the With Project water level as compared to Without Project water level, as determined by using an average of the most recent versions of the models. After years end, the models shall be updated with the actual operations data for that year and recalibrated, and the average of the results of such modeling shall be used for a final allocation of the projects' proportionate contributions levels. If appropriate, the parties shall exchange funds and/or water supplies among them in accordance with the final allocation. For administrative ease, only an initial and final allocation for a given year shall be required. This procedure shall apply to mitigation for both domestic and agricultural wells.

c. All costs expended by any Party for equipment, water supplies or labor that is/are purchased or provided to address emergency health and safety concerns at domestic wells (exclusive of the costs described in 4.b. above) shall initially be allocated equally between the Parties. These costs shall be reallocated among the parties after years end per the procedure described in 4.b. above, provided that only those domestic wells for which emergency health and safety costs were incurred by a party shall be included in such reallocation, and further provided that the projects' proportionate contribution levels shall be based on the melded average of the results of the reallocation at all of the wells included in the reallocation.

d. All costs expended by any JOC participant in the administration of the JOC on behalf of all participants (e.g., processing claim response letters, calls from claimants, postage, notary public services, etc.) shall initially be allocated equally between the Parties. These costs shall be reallocated after years end per the procedure described in 4.b. above.

5. **Additional Actions and Miscellaneous.**

a. The term of this Operations Plan shall commence on February 1, 2017, and shall terminate on January 31, 2019. The Parties may agree to extend this Operations Plan and will meet starting October 1, 2018 to discuss any extension.

b. Modification language - This Operations Plan may not be altered, amended, or modified in any respect, except by unanimous consent of the Parties. Any modification to this Operations Plan must be made in writing and executed by all the Parties.

c. Except as set forth below, in the event the Joint Operations Committee cannot agree on (1) the implementation of this agreement, or (2) the proper action in response to a landowner claim, such dispute shall be submitted to binding arbitration before a single neutral arbitrator appointed by the Parties, and in absence of such consent, appointed by the presiding judge of the Kern County Superior Court. Any arbitrator selected by the parties shall have experience arbitrating groundwater disputes. The arbitration shall be called and conducted in accordance with such rules as the Parties shall agree upon, and in the absence of such agreement, in accordance with the procedures set forth in California Code of Civil Procedure section 1282, et seq. Notwithstanding the foregoing, in any arbitration the Parties agree that discovery will be allowed pursuant to Code of Civil Procedure section 1283.05. The Parties shall attempt to jointly appoint the neutral arbitrator within ten (10) days after a dispute arises, and in the event the Parties cannot agree to a neutral arbitrator within said ten-day period, either Party may make a request to the presiding judge of the Kern County Superior Court immediately thereafter. In the event a landowner submits a claim and the Joint Operations Committee cannot agree on the proper action in response, the arbitration requirement shall be contingent upon the landowner's express written consent to proceed and be bound by arbitration and to pay his/her/its proportionate share of arbitrator fees and related costs. Absent such landowner consent, there shall be no obligation on the part of either Party to arbitrate any such dispute.

d. With respect to the interpretation and enforcement of this Plan, and with respect to the resolution of any matter left for future determination or implementation, the Parties agree to carry out such duties and responsibilities in good faith and in cooperation with one another, to the end that the objectives and purposes of this agreement will be achieved and/or carried out to the greatest extent practicable.

APPROVED this ___ day of _____, 2017

"PARTIES"

KERN COUNTY WATER AGENCY, on behalf of itself and the Pioneer Project Recovery Participants

By:_____

KERN WATER BANK AUTHORITY

By:_____

ROSEDALE-RIO BRAVO WATER STORAGE DISTRICT

By:_____

Joint Operations Committee
Well Cost Alternatives Worksheet

Date: October 13, 2015
Case No. 15-017
Name: Ross Johnson

A. Notes:

1. Pump was lowered in 2015.
2. Pump was pulled in October 2015 and found to be sanded up. (ME Beggs Invoice)
3. Bottom of well was tagged in October 2015 at 288 ft or 6 ft shallower than a year ago. (ME Beggs Invoice)
4. Casing is flaking off (ME Beggs Invoice)

B. Exhibit A Analysis:

i. Pump Capacity Analysis:

Required Pump Flow Rate (Estimated)					10 GPM
Measured Pump Flow Rate (Estimated)					0 GPM
Difference					10 GPM
Adequate Capacity	Yes		No	X	

ii. Pump Setting Analysis:

Depth of Casing					288 Ft
Depth to Water (Static)					222 Ft
Depth to Pumping Water Level (Estimated)					231.5 Ft
Drawdown					9.5 Ft
Pump Setting					284 Ft
Pump Submergence					52.5 Ft
Adequate Submergence	Yes	X	No		
Projected static depth to water level (From Study)					250 Ft
Drawdown					9.5
Required Submergence					50
Projected 10 Year Casing Setting					175
Modified Pump Setting					485 Ft
Existing Casing Depth					288 Ft
Modified Pump Setting					485 Ft
15 feet minimum pump clearance					15 Ft
Required casing depth in ten years					500 Ft
Existing Casing Depth below Required Casing Depth					(212) Ft
Adequate Clearance	Yes		No	X	

C. Well Replacement Analysis

Well Replacement Depreciation Analysis:

Existing well casing - Expected Life	50 Years
Existing well casing - Age	38
Existing well casing - Expected Remaining Life (Casing has failed)	0
Existing pump -- Expected Life	15 Years
Existing pump - (Pump replaced in July 2015)	0
Existing pump - Expected Remaining Life	15

Note: In some cases, existing column, tube, shaft and motor should also be evaluated, or included with Existing pump.

Facility Remaining Replacement Cost Analysis:

	Cost	Cont. Amount	Total
Drilling and casing cost for new well.	90,000	9,000	$99,000
Purchase and installation of new pumping equipment	5,000	500	$5,500
Salvage Value			$0
Total:			$104,500

Unit Well Replacement Cost	$99,000	/	500 FT =		$198 /FT
Existing Well - Replace Cost	$198	/FT x	288 FT =		57,024
Existing Well - Depreciated Value					57,024
Existing Well - Remaining Value					0
New Well - Incremental Cost	$198	/FT x	212 FT =		41,976
Action Fund Mitigation Cost					$41,976
Unit Pump Replacement Cost	$5,500	/	485 FT =		$11 /FT
Existing Pump - Replace Cost	$11	/FT x	284 FT =		3,224
Existing Pump - Depreciated Value					0
Existing Pump - Remaining Value					3,224
New Pump - Incremental Cost	$11	/FT x	201 FT =		2,276
Action Fund Mitigation Cost					$5,500

Facility Replacement Cost Summary:

Owner Cost for Facility Replacement	**$57,024**
Action Fund Cost for Facility Replacement	**$47,476**
Total Replacement Cost	**$104,500**

D. Cost Alternative Summary:

1) Cost to drill new well to a depth of 495 ft.	$99,000
2) Incremental cost to drill new well from 288 ft down to 495 ft.	$41,976
3) Drill New Well & Provide Pump (Full Cost)	$104,500

E. Action Fund Cost

Exhibit A - Incremental cost to drill new well from 288 ft down to 495 ft and lower pump from 284 ft to 485 ft.	**$47,476**

Appendix C

Air Quality and Greenhouse Gas Emissions Calculations

ESA

IRWD Fan Groundwater Assumptions

Project Land Uses

	Land Use Type	CalEEMod LandUse Type	CalEEMod LandUse Subtype	Acres	Amount	Unit	Linear Length feet, Depth/Volume,
Per Phase	Recharge Facilities					Acres	
	Basins + Site Restoration	Parking	Other Non-Asphalt Lot	640	640	Acres	640
	Pipelines	Parking	Other Non-Asphalt Lot	covered in recharge basin acreage	0.375	1000sqft	375
Per Well	Recovery Wells						
	Well	Parking	Other Non-Asphalt Lot	0.07	3.000	1000sqft	3,000
	Well head				6	1000sqft	0.50
	Pipelines				2.500	1000sqft	2,500
Total	Conveyance Facilities	Parking	Other Non-Asphalt Lot	21.50		Acres	936,737
	Earth Lined Canal	Parking	Other Non-Asphalt Lot	21.30	21.3	Acres	928000.0
	Turnout	Parking	Other Non-Asphalt Lot	0.06	0.1	Acres	2,450
	Pipelines	Parking	Other Non-Asphalt Lot	0.14	6.3	1000sqft	6,287
Per	Pump Stations	Parking	Other Non-Asphalt Lot	0.07	3.00	1000sqft	3,000

Construction Data

From Construction schedule of Feasibility Study

	Construction Phase	CalEEMod Phase Type	Start Date	End Date	Total Calendar Days	Workdays (5 days/week)	Total Worker Trips	Total Vendor Trips (Water+Concrete)	Total Haul Trips
Phase 1	Recharge Facilities								
	Demolition/Site Clearing	Demolition	7/2/2021	9/30/2021	90	65	650	260	642
	Pipelines	Trenching	7/2/2021	9/30/2021	90	65	650	260	30
	Basins	Grading	7/2/2021	4/30/2022	302	216	4320	864	37500
	2021		7/2/2021	12/31/2021	182	131	2620	524	22743
	2022		1/1/2022	4/30/2022	119	85	1700	340	8950
	Restoration	Grading	4/1/2022	4/30/2022	29	21	126	84	
Per Well	Recovery Wells								
	Well Drilling (per construction team)	Grading	5/2/2022	6/30/2022	59	44	440	176	8
	Well Construction	Construction	4/3/2023	6/10/2023	68	50	500	202	
	Pipelines	Trenching	4/3/2023	6/30/2023	88	65	650	260	122
Total	Conveyance Facilities								
	Turnout, Pipelines, Canal	Grading	4/26/2023	5/19/2026	1119	800	16000	7614	76252
	2023		4/26/2023	12/31/2023	249	178	3560	1717	16967
	2024		1/1/2024	12/31/2024	365	262	5240	2484	24973
	2025		1/1/2025	12/31/2025	364	261	5220	2474	24877
	2026		1/1/2026	5/19/2026	138	99	1980	939	9436
Per Station	Conveyance Facilities								
	Pumpstations	Construction	4/26/2023	2/28/2024	308	221	2652	896	
	2023		4/26/2023	12/31/2023	249	178	2136	724	154
	2024		1/1/2024	2/28/2024	58	43	516	172	
Phase 2	Recharge Facilities								
	Demolition/Site Clearing	Demolition	2/28/2022	5/31/2022	92	67	670	368	642
	Pipelines	Trenching	2/28/2022	5/31/2022	92	67	670	368	30
	Basins	Grading	2/28/2022	12/31/2022	306	220	4400	1224	37500
	Restoration	Grading	12/1/2022	12/31/2022	30	22	132	120	
Per Well	Recovery Wells								
	Well Drilling (per construction team)	Grading	1/2/2023	2/28/2023	57	42	420	168	8
	Well Construction	Construction	12/4/2023	2/11/2024	69	50	500	202	
	2023		12/4/2023	12/31/2023	27	20	200	82	
	2024		1/1/2024	2/11/2024	41	30	300	120	
	Pipelines	Trenching	12/4/2023	2/28/2024	86	63	630	252	122
	2023		12/4/2023	12/31/2023	27	20	200	80	39
	2024		1/1/2024	2/28/2024	58	43	430	172	83
Total	Start Up/Testing+Float Day		5/20/2026	8/12/2026	84	61	610		

Per Construction Phase

Demolition

Piping	
Piping Length (ft)	13,200
Diameter (ft)	1.5
Excavation Depth (ft)	7.00
Hardscape Debris Volume (CY)	5,133
Debris weight (lb):Volume (CY)[1]	2,400
Piping Debris Weight (tons)	6,160
Total Debris Weight (tons)	6,160
Total Demolition Debris (CY)	**5,133**
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	321
Total Haul Truck Trips (In/Out)	**642**
Miles Per Trip	20

Per Well

Concrete Pad - Concrete Trucks

Parameters	**Amount**
Concrete Pad Size (ft2)	500.00
Thickness (ft)	0.50
Concrete Volume (ft^3)	250.0
Concrete Volume (CY)	**9**
Concrete Truck Capacity (CY)	10
Total Haul Trucks Required	1
Total Haul Truck Trips (In/Out)	**2**
Phase 1-Miles Per Trip	25.0
Phase 2-Miles Per Trip	25.0

Excavation Quantities Per Well - Well Drilling

Parameters	**Amount**
Radius (ft)	1.00
Depth (ft)	900
Excavation Volume (ft^3) - Per Well	2,827
Total Excavation Volume	2,827
Excavation Volume (Export) (CY)	**105**
Assume 50% Excavation moved onsite without trucks	52
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	4
Total Haul Truck Trips (one-way trips, around site)	**8**
Phase 1-Miles Per Trip	4.0
Phase 2-Miles Per Trip	2.6

Per Construction Phase

Excavation Quantities - Recharge Basins

Parameters	**Amount**
Site Area (acres)	640.00
Site Area (ft^2)	27,878,400
Excavation Depth (ft)	1
Excavation Volume (Export) (CY)	**600,000**
Assume 50% Excavation moved onsite without trucks	**300,000**
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	18,750
Total Haul Truck Trips (one-way trips, around site)	**37,500**
Phase 1-Miles Per Trip	4.0
Phase 2-Miles Per Trip	2.6

Recharge Basin Pipeline Grading

Parameters	**Amount**
Piping length (ft)	350
Diameter (ft)	6
Excavation Depth (ft)	6
Excavation Volume (ft^3)	12,600
Excavation Volume (Export) (CY)[4]	**467**
Assume 50% Excavation moved onsite without trucks	**233**
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	15
Total Haul Truck Trips (one-way trips, around site)	**30**
Phase 1-Miles Per Trip	4.0
Phase 2-Miles Per Trip	2.6

Conveyance Facilities

Excavation Quantities - Conveyance Canal

Parameters	**Amount**
Cut (CY)	244,227
Fill (CY)	716,381
Subgrade Preparation (CY)	226,189
Excavation Volume (Export) (CY)[5]	**1,186,797**
Assume 50% Excavation moved onsite without trucks	**593,399**
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	37,088
Total Haul Truck Trips (one-way trips, around site)	**74,176**
Phase 1-Miles Per Trip	4.0
Phase 2-Miles Per Trip	2.6

Excavation Quantities - Conveyance Facilities Piping

Parameters	**Amount**
Piping length (ft)	6,287
Diameter (ft)	6
Excavation Depth (ft)	22
Excavation Volume (ft^3)	829,818
Excavation Volume (Export) (CY)[4]	**30,734**
Assume 50% Excavation moved onsite without trucks	**15,367**
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	961
Total Haul Truck Trips (one-way trips, around site)	**1,922**
Phase 1-Miles Per Trip	4.0
Phase 2-Miles Per Trip	2.6

Excavation Quantities - Turnout

Parameters	**Amount**
Excavation Volume (Export) (CY)[5]	**2,450**
Assume 50% Excavation moved onsite without trucks	**1,225**
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	77
Total Haul Truck Trips (one-way trips, around site)	**154**
Phase 1-Miles Per Trip	4.0
Phase 2-Miles Per Trip	2.6

Notes:

CalRecycle Weights and Volumes

1 Haul truck capacity based on CalEEMod default of 16 CY per truck

3 Concrete truck capacity assumed to be 10 CY per truck.

4 Phase 1 and 2 Trip lengths for hauling excavation materials is based on measurements taken in google earth from center point of Phase 1 and Phase 2 site areas to the furthest diagonal direction for both sites.

Excavation Quantities - Recovery Well Pipeline Grading

Parameters	Amount
Piping length (ft)	2,500
Diameter (ft)	3
Excavation Depth (ft)	7
Excavation Volume (ft^3)	52,500
Excavation Volume (Export) (CY)[4]	**1,944**
Assume 50% Excavation moved onsite without trucks	972
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	61
Total Haul Truck Trips (one-way trips, around site)	**122**
Phase 1-Miles Per Trip	4.0
Phase 2-Miles Per Trip	2.6

Concrete Quantities - Conveyance Canal

Parameters	Amount
Concrete Volume (Import) (CY)[5]	**21,911**
Haul Truck Capacity (CY)	10
Total Haul Trucks Required	2,192
Total Haul Truck Trips (In/Out)	**4,384**
Phase 1-Miles Per Trip	25.0
Phase 2-Miles Per Trip	25.0

Concrete Quantities - Turnout

Parameters	Amount
Concrete Volume (Export) (CY)[5]	**150**
Haul Truck Capacity (CY)	10
Total Haul Trucks Required	15
Total Haul Truck Trips (In/Out)	**30**
Phase 1-Miles Per Trip	4.0
Phase 2-Miles Per Trip	2.6

Per Pump Station

Concrete Quantities - Pump Station

Parameters	Amount
Concrete Pad Size (ft2)	3,000.00
Thickness (ft)	0.50
Concrete Volume (ft^3)	1,500.0
Concrete Volume (CY)	**56**
Concrete Truck Capacity (CY)	10
Total Haul Trucks Required	6
Total Haul Truck Trips (In/Out)	**12**
Phase 1-Miles Per Trip	25.0
Phase 2-Miles Per Trip	25.0

Excavation Quantities - Pump Station

Parameters	Amount
Pad Size (ft2)	3,000
Excavation Depth (ft)	22
Excavation Volume (ft^3)	66,000
Excavation Volume (Export) (CY)[4]	**2,444**
Assume 50% Excavation moved onsite without trucks	1,222
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	77
Total Haul Truck Trips (one-way trips, around site)	**154**
Phase 1-Miles Per Trip	4.0
Phase 2-Miles Per Trip	2.6

IRWD Fan Groundwater Assumptions

Operational Activities

Operational Activity	Description	Notes	Frequency/unit
Energy Consumption			
Recharge Facilities			
	Electricity required for booster pumps operating in per pump station	30 kwh/AF	Annual
	100,000 AF/year	900000.00	kwh/yr
Recovery Wells			
	Electricity required for recovery well	600 kwh/AF	Annual
	50,000 AF/year	30,000,000.00	kwh/yr

Weed and Pest Control

Workers	2	
Frequency	4	per year
	20	days per occurrence
	80	max days/per year
Equpment	1	crawler tractor
	1	Backhoe
	1	Water Truck
	1	spray rig - modeled as other construction equipment

Earthwork

Workers	4	
Frequency	1	Every 3 years
	90	days per occurrence
Equpment	2	Graders
	2	Rubber Tired Loader
	2	crawler tractor

Earthwork- Grading Amount

Parameters	Amount
Site Area (acres)	1,300.00
Site Area (ft^2)	56,628,000
Excavation Depth (ft)	0.08
Excavation Volume (ft^3)	4,719,000
Excavation Volume (CY)	**174,778**
Assume 50% Excavation moved onsite without trucks	87389
Haul Truck Capacity (CY)	16
Total Haul Trucks Required	5,462
Total Haul Truck Trips (In/Out)	**10,924**
Total Haul Truck Trips (In/Out) per day	122
Miles Per Trip	3.3

Operational Trip lengths for hauling excavation materials is based on measurements taken in google earth from center point of Phase 1 and Phase 2 site areas to the furthest diagonal direction and averaged across both sites.

IRWD Fan Groundwater Assumptions

Construction Equipment

Recharge Facilities

Subphase	CalEEMod Phase Type	Equipment Type	# of Equipment
Demolition/Site Clearing	Demolition	Excavators	2
Demolition/Site Clearing	Demolition	Grader	1
Demolition/Site Clearing	Demolition	Rubber Tired Loader	1
Pipelines	Trenching	Back hoes	1
Pipelines	Trenching	Crane	1
Pipelines	Trenching	Excavators	1
Pipelines	Trenching	Grader	1
Pipelines	Trenching	Rubber Tired Loader	1
Basins	Grading	Excavators	2
Basins	Grading	Graders	4
Basins	Grading	Rubber Tired Loader	1
Restoration	Grading	Back hoes	1
Restoration	Grading	Grader	1

Recovery Wells

Subphase	CalEEMod Phase Type	Equipment Type	# of Equipment
Well Drilling (per construction team)	Grading	Back hoes	1
Well Drilling (per construction team)	Grading	Bore/Drill Rig	1
Well Drilling (per construction team)	Grading	Rubber Tired Loader	1
Well Construction	Construction	Back hoes	1
Well Construction	Construction	Crane	1
Well Construction	Construction	Concrete and Mortar Mixer	1
Pipelines	Trenching	Back hoes	1
Pipelines	Trenching	Crane	1
Pipelines	Trenching	Excavator	1
Pipelines	Trenching	Grader	1
Pipelines	Trenching	Rubber Tired Loader	1

Conveyance Facilities

Subphase	CalEEMod Phase Type	Equipment Type	# of Equipment
Turnout, Pipelines, Canal	Grading	Back hoes	1
Turnout, Pipelines, Canal	Grading	Crane	1
Turnout, Pipelines, Canal	Grading	Excavator	2
Turnout, Pipelines, Canal	Grading	Grader	1
Turnout, Pipelines, Canal	Grading	Rubber Tired Loader	1
Turnout, Pipelines, Canal	Grading	Concrete and Mortar Mixer	1
Pumpstations	Construction	Back hoes	1
Pumpstations	Construction	Crane	1
Pumpstations	Construction	Excavator	1
Pumpstations	Construction	Rubber Tired Loader	1
Pumpstations	Construction	Concrete and Mortar Mixer	1

Note: dump trucks modeled as haul trucks and water trucks modeled as vendor trucks

Utility Provider CO2 Intensity Factor.

PG&E

Year	RPS Mandate[2,3]	Electricity Emission Factor (lbs CO2/MWh)
Base	0.00%	337.70
2018[1]	39.00%	206.00

Year	% Renewable	Electricity Emission Factor (lbs CO2/MWh)
2018	39.00%	206.00
2019	39.83%	203.19
2020	40.67%	200.37
2021	41.50%	197.56
2022	42.33%	194.74
2023	43.17%	191.93
2024	44.00%	189.11
2025	47.00%	178.98
2026	50.00%	168.85
2027	52.00%	162.10
2028	54.67%	153.09
2029	57.33%	144.09
2030	60.00%	135.08
2031	62.67%	126.08
2032	65.33%	117.07
2033	68.00%	108.07
2034	70.67%	99.06
2035	73.33%	90.05
2036	76.00%	81.05
2037	78.67%	72.04
2038	81.33%	63.04
2039	84.00%	54.03
2040	86.67%	45.03
2041	89.33%	36.02
2042	92.00%	27.02
2043	94.67%	18.01
2044	97.33%	9.01
2045	100.00%	0.00
2046	100.00%	0.00
2047	100.00%	0.00
2048	100.00%	0.00
2049	100.00%	0.00
2050	100.00%	0.00
2051	100.00%	0.00
2052	100.00%	0.00
2053	100.00%	0.00
2054	100.00%	0.00

[1] PG&E, Fighting Climate Change, https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/fighting-climate-change/fighting-climate-change.page

2 https://www.pge.com/pge_global/common/pdfs/your-account/your-bill/understand-your-bill/bill-inserts/2019/1019-Power-Content-Label.pdf

https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180

Project Construction Emissions

Kern Fan Groundwater

Unmitigated AQ Emissions Summary of Construction

Unmitigated Construction Emissions in Tons/Year

YEAR	EMISSIONS (TONS/YEAR)					
	VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
2021	0.38	4.91	3.12	0.01	0.37	0.16
2022	0.76	9.52	6.77	0.02	1.12	0.30
2023	1.00	10.78	9.29	0.03	0.63	0.41
2024	0.61	6.73	6.20	0.02	0.37	0.23
2025	0.35	3.86	3.95	0.01	0.21	0.12
2026	0.11	1.24	1.32	0.003	0.05	0.03
Maximum	**1.00**	**10.78**	**9.29**	**0.03**	**1.12**	**0.41**
De Minimis Thresholds	10	10	100	27	15	15
Exceeds De Minimis?	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**

Kern Fan Groundwater

Mitigated AQ Emissions Summary of Construction

Mitigated Construction Emissions in Tons/Year

YEAR	EMISSIONS (TONS/YEAR)					
	VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
2021	0.19	3.16	4.10	0.01	0.27	0.06
2022	0.39	6.70	9.27	0.02	0.82	0.12
2023	0.44	7.86	13.05	0.03	0.30	0.11
2024	0.30	5.30	8.23	0.02	0.20	0.07
2025	0.21	3.47	5.02	0.01	0.13	0.05
2026	0.07	1.17	1.65	0.003	0.05	0.005
Maximum	**0.44**	**7.86**	**13.05**	**0.03**	**0.82**	**0.12**
De Minimis Thresholds	10	10	100	27	15	15
Exceeds De Minimis?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Kern Fan Groudwater

GHG Emissions Summary of Construction

Construction Emissions in Metric Tons/Year

YEAR	EMISSIONS (METRIC TONS/YEAR)
	CO2e
2021	832.15
2022	1849.35
2023	2311.57
2024	1495.93
2025	943.31
2026	312.30
Maximum	**2311.57**
Total	**7744.61**
Amortized (30 year)	**258.15**
Significance Threshold	10000.00
Exceeds De Minimis?	**NO**

Recharge Facilities - Phase 1

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	640.00	Acre	640.00	27,878,400.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Grading - see construction assumptions

Demolition -

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	1,085.00	21.00
tblConstructionPhase	NumDays	700.00	65.00
tblConstructionPhase	NumDays	1,085.00	216.00
tblConstructionPhase	PhaseEndDate	6/10/2077	4/30/2022
tblConstructionPhase	PhaseEndDate	3/7/2024	9/30/2021
tblConstructionPhase	PhaseEndDate	12/13/2029	4/30/2022
tblConstructionPhase	PhaseEndDate	10/16/2025	9/30/2021
tblConstructionPhase	PhaseStartDate	6/29/2074	4/1/2022
tblConstructionPhase	PhaseStartDate	10/17/2025	7/2/2021
tblConstructionPhase	PhaseStartDate	3/8/2024	7/2/2021
tblGrading	AcresOfGrading	432.00	590.00
tblGrading	AcresOfGrading	10.50	50.00
tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripNumber	609.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2648	3.1534	1.6728	4.4500e-003	0.3798	0.1121	0.4919	0.0439	0.1031	0.1471	0.0000	391.2414	391.2414	0.1265	0.0000	394.4048
2022	0.1063	1.2468	0.6764	1.9300e-003	0.3394	0.0428	0.3821	0.0366	0.0393	0.0760	0.0000	169.9017	169.9017	0.0550	0.0000	171.2755
Maximum	**0.2648**	**3.1534**	**1.6728**	**4.4500e-003**	**0.3798**	**0.1121**	**0.4919**	**0.0439**	**0.1031**	**0.1471**	**0.0000**	**391.2414**	**391.2414**	**0.1265**	**0.0000**	**394.4048**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2648	3.1534	1.6728	4.4500e-003	0.1709	0.1121	0.2830	0.0198	0.1031	0.1229	0.0000	391.2409	391.2409	0.1265	0.0000	394.4043
2022	0.1063	1.2468	0.6764	1.9300e-003	0.1527	0.0428	0.1955	0.0165	0.0393	0.0558	0.0000	169.9015	169.9015	0.0550	0.0000	171.2753
Maximum	**0.2648**	**3.1534**	**1.6728**	**4.4500e-003**	**0.1709**	**0.1121**	**0.2830**	**0.0198**	**0.1031**	**0.1229**	**0.0000**	**391.2409**	**391.2409**	**0.1265**	**0.0000**	**394.4043**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**55.00**	**0.00**	**45.25**	**55.00**	**0.00**	**19.87**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**7-2-2021**	**10-1-2021**	2.2920	2.2920
2	**10-2-2021**	**1-1-2022**	1.1321	1.1321
3	**1-2-2022**	**4-1-2022**	0.9664	0.9664
4	**4-2-2022**	**7-1-2022**	0.3883	0.3883
		Highest	2.2920	2.2920

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/2/2021	9/30/2021	5	65	
2	Pipelines	Trenching	7/2/2021	9/30/2021	5	65	
3	Basins	Grading	7/2/2021	4/30/2022	5	216	
4	Restoration	Grading	4/1/2022	4/30/2022	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 640

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Restoration	Air Compressors	0	6.00	78	0.48
Demolition	Excavators	2	8.00	158	0.38
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Basins	Excavators	2	8.00	158	0.38
Restoration	Excavators	0	8.00	158	0.38
Restoration	Graders	1	8.00	187	0.41
Restoration	Rubber Tired Dozers	0	8.00	247	0.40
Restoration	Scrapers	0	8.00	367	0.48
Restoration	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Basins	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Graders	1	8.00	187	0.41
Basins	Graders	4	8.00	187	0.41
Basins	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Demolition	Rubber Tired Loaders	1	8.00	203	0.36
Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipelines	Rubber Tired Dozers	0	8.00	247	0.40
Basins	Scrapers	0	8.00	367	0.48
Pipelines	Cranes	1	8.00	231	0.29
Pipelines	Excavators	1	8.00	158	0.38
Pipelines	Graders	1	8.00	187	0.41
Pipelines	Rubber Tired Loaders	1	8.00	203	0.36
Basins	Rubber Tired Loaders	1	8.00	203	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipelines	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Basins	7	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Restoration	2	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0669	0.0000	0.0669	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0408	0.4581	0.3221	7.5000e-004		0.0171	0.0171		0.0157	0.0157	0.0000	66.2873	66.2873	0.0214	0.0000	66.8233
Total	**0.0408**	**0.4581**	**0.3221**	**7.5000e-004**	**0.0669**	**0.0171**	**0.0840**	**0.0101**	**0.0157**	**0.0259**	**0.0000**	**66.2873**	**66.2873**	**0.0214**	**0.0000**	**66.8233**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0301	0.0000	0.0301	4.5600e-003	0.0000	4.5600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0408	0.4581	0.3221	7.5000e-004		0.0171	0.0171		0.0157	0.0157	0.0000	66.2873	66.2873	0.0214	0.0000	66.8232
Total	**0.0408**	**0.4581**	**0.3221**	**7.5000e-004**	**0.0301**	**0.0171**	**0.0472**	**4.5600e-003**	**0.0157**	**0.0203**	**0.0000**	**66.2873**	**66.2873**	**0.0214**	**0.0000**	**66.8232**

Mitigated Construction Off-Site

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

3.3 Pipelines - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0528	0.6067	0.3538	8.7000e-004		0.0237	0.0237		0.0218	0.0218	0.0000	76.8509	76.8509	0.0249	0.0000	77.4723
Total	**0.0528**	**0.6067**	**0.3538**	**8.7000e-004**		**0.0237**	**0.0237**		**0.0218**	**0.0218**	**0.0000**	**76.8509**	**76.8509**	**0.0249**	**0.0000**	**77.4723**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0528	0.6067	0.3538	8.7000e-004		0.0237	0.0237		0.0218	0.0218	0.0000	76.8508	76.8508	0.0249	0.0000	77.4722
Total	**0.0528**	**0.6067**	**0.3538**	**8.7000e-004**		**0.0237**	**0.0237**		**0.0218**	**0.0218**	**0.0000**	**76.8508**	**76.8508**	**0.0249**	**0.0000**	**77.4722**

Mitigated Construction Off-Site

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

3.4 Basins - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3129	0.0000	0.3129	0.0338	0.0000	0.0338	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1713	2.0887	0.9969	2.8200e-003		0.0713	0.0713		0.0656	0.0656	0.0000	248.1032	248.1032	0.0802	0.0000	250.1092
Total	**0.1713**	**2.0887**	**0.9969**	**2.8200e-003**	**0.3129**	**0.0713**	**0.3842**	**0.0338**	**0.0656**	**0.0994**	**0.0000**	**248.1032**	**248.1032**	**0.0802**	**0.0000**	**250.1092**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1408	0.0000	0.1408	0.0152	0.0000	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1713	2.0887	0.9969	2.8200e-003		0.0713	0.0713		0.0656	0.0656	0.0000	248.1029	248.1029	0.0802	0.0000	250.1089
Total	**0.1713**	**2.0887**	**0.9969**	**2.8200e-003**	**0.1408**	**0.0713**	**0.2121**	**0.0152**	**0.0656**	**0.0808**	**0.0000**	**248.1029**	**248.1029**	**0.0802**	**0.0000**	**250.1089**

Mitigated Construction Off-Site

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

3.4 Basins - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3129	0.0000	0.3129	0.0338	0.0000	0.0338	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1002	1.1740	0.6348	1.8300e-003		0.0401	0.0401		0.0369	0.0369	0.0000	160.9238	160.9238	0.0521	0.0000	162.2250
Total	**0.1002**	**1.1740**	**0.6348**	**1.8300e-003**	**0.3129**	**0.0401**	**0.3529**	**0.0338**	**0.0369**	**0.0706**	**0.0000**	**160.9238**	**160.9238**	**0.0521**	**0.0000**	**162.2250**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1408	0.0000	0.1408	0.0152	0.0000	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1002	1.1740	0.6348	1.8300e-003		0.0401	0.0401		0.0369	0.0369	0.0000	160.9236	160.9236	0.0521	0.0000	162.2248
Total	**0.1002**	**1.1740**	**0.6348**	**1.8300e-003**	**0.1408**	**0.0401**	**0.1808**	**0.0152**	**0.0369**	**0.0521**	**0.0000**	**160.9236**	**160.9236**	**0.0521**	**0.0000**	**162.2248**

Mitigated Construction Off-Site

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

3.5 Restoration - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0265	0.0000	0.0265	2.8600e-003	0.0000	2.8600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0900e-003	0.0728	0.0416	1.0000e-004		2.7000e-003	2.7000e-003		2.4900e-003	2.4900e-003	0.0000	8.9779	8.9779	2.9000e-003	0.0000	9.0505
Total	**6.0900e-003**	**0.0728**	**0.0416**	**1.0000e-004**	**0.0265**	**2.7000e-003**	**0.0292**	**2.8600e-003**	**2.4900e-003**	**5.3500e-003**	**0.0000**	**8.9779**	**8.9779**	**2.9000e-003**	**0.0000**	**9.0505**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0119	0.0000	0.0119	1.2900e-003	0.0000	1.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0900e-003	0.0728	0.0416	1.0000e-004		2.7000e-003	2.7000e-003		2.4900e-003	2.4900e-003	0.0000	8.9779	8.9779	2.9000e-003	0.0000	9.0505
Total	**6.0900e-003**	**0.0728**	**0.0416**	**1.0000e-004**	**0.0119**	**2.7000e-003**	**0.0146**	**1.2900e-003**	**2.4900e-003**	**3.7800e-003**	**0.0000**	**8.9779**	**8.9779**	**2.9000e-003**	**0.0000**	**9.0505**

Mitigated Construction Off-Site

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

Recharge Facilities - Phase 2

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	640.00	Acre	640.00	27,878,400.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Grading - see construction assumptions

Demolition -

Trips and VMT - construction mobile emissions calculated outside of CalEEMod.

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	1,085.00	22.00
tblConstructionPhase	NumDays	700.00	67.00
tblConstructionPhase	NumDays	1,085.00	220.00
tblConstructionPhase	PhaseEndDate	2/4/2078	12/31/2022
tblConstructionPhase	PhaseEndDate	11/1/2024	5/31/2022
tblConstructionPhase	PhaseEndDate	8/9/2030	12/31/2022
tblConstructionPhase	PhaseEndDate	6/12/2026	5/31/2022
tblConstructionPhase	PhaseStartDate	2/23/2075	12/1/2022
tblConstructionPhase	PhaseStartDate	6/13/2026	2/28/2022
tblConstructionPhase	PhaseStartDate	11/2/2024	2/28/2022
tblGrading	AcresOfGrading	440.00	590.00
tblGrading	AcresOfGrading	11.00	50.00
tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripNumber	609.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.3514	4.0441	2.3703	6.5300e-003	0.4063	0.1420	0.5483	0.0468	0.1306	0.1774	0.0000	573.4558	573.4558	0.1855	0.0000	578.0925
Maximum	**0.3514**	**4.0441**	**2.3703**	**6.5300e-003**	**0.4063**	**0.1420**	**0.5483**	**0.0468**	**0.1306**	**0.1774**	**0.0000**	**573.4558**	**573.4558**	**0.1855**	**0.0000**	**578.0925**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.3514	4.0441	2.3703	6.5300e-003	0.1828	0.1420	0.3248	0.0211	0.1306	0.1517	0.0000	573.4551	573.4551	0.1855	0.0000	578.0918
Maximum	**0.3514**	**4.0441**	**2.3703**	**6.5300e-003**	**0.1828**	**0.1420**	**0.3248**	**0.0211**	**0.1306**	**0.1517**	**0.0000**	**573.4551**	**573.4551**	**0.1855**	**0.0000**	**578.0918**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**55.00**	**0.00**	**40.76**	**55.00**	**0.00**	**14.50**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**2-28-2022**	**5-27-2022**	1.9158	1.9158
2	**5-28-2022**	**8-27-2022**	1.0284	1.0284
3	**8-28-2022**	**9-30-2022**	0.3641	0.3641
		Highest	1.9158	1.9158

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	2/28/2022	5/31/2022	5	67	
2	Pipelines	Trenching	2/28/2022	5/31/2022	5	67	
3	Basins	Grading	2/28/2022	12/31/2022	5	220	
4	Restoration	Grading	12/1/2022	12/31/2022	5	22	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 640

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Restoration	Air Compressors	0	6.00	78	0.48
Demolition	Excavators	2	8.00	158	0.38
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Basins	Excavators	2	8.00	158	0.38
Restoration	Excavators	0	8.00	158	0.38
Restoration	Graders	1	8.00	187	0.41
Restoration	Rubber Tired Dozers	0	8.00	247	0.40
Restoration	Scrapers	0	8.00	367	0.48
Restoration	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Basins	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Graders	1	8.00	187	0.41
Basins	Graders	4	8.00	187	0.41
Basins	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Demolition	Rubber Tired Loaders	1	8.00	203	0.36
Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipelines	Rubber Tired Dozers	0	8.00	247	0.40
Basins	Scrapers	0	8.00	367	0.48
Pipelines	Cranes	1	8.00	231	0.29
Pipelines	Excavators	1	8.00	158	0.38
Pipelines	Graders	1	8.00	187	0.41
Pipelines	Rubber Tired Loaders	1	8.00	203	0.36
Basins	Rubber Tired Loaders	1	8.00	203	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipelines	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Basins	7	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Restoration	2	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0669	0.0000	0.0669	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0372	0.3965	0.3271	7.8000e-004		0.0148	0.0148		0.0136	0.0136	0.0000	68.3173	68.3173	0.0221	0.0000	68.8697
Total	**0.0372**	**0.3965**	**0.3271**	**7.8000e-004**	**0.0669**	**0.0148**	**0.0817**	**0.0101**	**0.0136**	**0.0237**	**0.0000**	**68.3173**	**68.3173**	**0.0221**	**0.0000**	**68.8697**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0301	0.0000	0.0301	4.5600e-003	0.0000	4.5600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0372	0.3965	0.3271	7.8000e-004		0.0148	0.0148		0.0136	0.0136	0.0000	68.3172	68.3172	0.0221	0.0000	68.8696
Total	**0.0372**	**0.3965**	**0.3271**	**7.8000e-004**	**0.0301**	**0.0148**	**0.0449**	**4.5600e-003**	**0.0136**	**0.0181**	**0.0000**	**68.3172**	**68.3172**	**0.0221**	**0.0000**	**68.8696**

Mitigated Construction Off-Site

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

3.3 Pipelines - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0484	0.5326	0.3566	9.0000e-004		0.0207	0.0207		0.0190	0.0190	0.0000	79.2243	79.2243	0.0256	0.0000	79.8649
Total	**0.0484**	**0.5326**	**0.3566**	**9.0000e-004**		**0.0207**	**0.0207**		**0.0190**	**0.0190**	**0.0000**	**79.2243**	**79.2243**	**0.0256**	**0.0000**	**79.8649**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0484	0.5326	0.3566	9.0000e-004		0.0207	0.0207		0.0190	0.0190	0.0000	79.2242	79.2242	0.0256	0.0000	79.8648
Total	**0.0484**	**0.5326**	**0.3566**	**9.0000e-004**		**0.0207**	**0.0207**		**0.0190**	**0.0190**	**0.0000**	**79.2242**	**79.2242**	**0.0256**	**0.0000**	**79.8648**

Mitigated Construction Off-Site

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

3.4 Basins - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3129	0.0000	0.3129	0.0338	0.0000	0.0338	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2593	3.0387	1.6430	4.7400e-003		0.1037	0.1037		0.0954	0.0954	0.0000	416.5087	416.5087	0.1347	0.0000	419.8764
Total	**0.2593**	**3.0387**	**1.6430**	**4.7400e-003**	**0.3129**	**0.1037**	**0.4165**	**0.0338**	**0.0954**	**0.1292**	**0.0000**	**416.5087**	**416.5087**	**0.1347**	**0.0000**	**419.8764**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1408	0.0000	0.1408	0.0152	0.0000	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2593	3.0387	1.6430	4.7400e-003		0.1037	0.1037		0.0954	0.0954	0.0000	416.5082	416.5082	0.1347	0.0000	419.8759
Total	**0.2593**	**3.0387**	**1.6430**	**4.7400e-003**	**0.1408**	**0.1037**	**0.2445**	**0.0152**	**0.0954**	**0.1106**	**0.0000**	**416.5082**	**416.5082**	**0.1347**	**0.0000**	**419.8759**

Mitigated Construction Off-Site

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

3.5 Restoration - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0265	0.0000	0.0265	2.8600e-003	0.0000	2.8600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.3800e-003	0.0763	0.0436	1.1000e-004		2.8300e-003	2.8300e-003		2.6000e-003	2.6000e-003	0.0000	9.4054	9.4054	3.0400e-003	0.0000	9.4815
Total	**6.3800e-003**	**0.0763**	**0.0436**	**1.1000e-004**	**0.0265**	**2.8300e-003**	**0.0293**	**2.8600e-003**	**2.6000e-003**	**5.4600e-003**	**0.0000**	**9.4054**	**9.4054**	**3.0400e-003**	**0.0000**	**9.4815**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0119	0.0000	0.0119	1.2900e-003	0.0000	1.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.3800e-003	0.0763	0.0436	1.1000e-004		2.8300e-003	2.8300e-003		2.6000e-003	2.6000e-003	0.0000	9.4054	9.4054	3.0400e-003	0.0000	9.4815
Total	**6.3800e-003**	**0.0763**	**0.0436**	**1.1000e-004**	**0.0119**	**2.8300e-003**	**0.0148**	**1.2900e-003**	**2.6000e-003**	**3.8900e-003**	**0.0000**	**9.4054**	**9.4054**	**3.0400e-003**	**0.0000**	**9.4815**

Mitigated Construction Off-Site

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

Recovery Wells - Phase 1

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.00	1000sqft	0.07	3,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Grading - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	100.00	50.00
tblConstructionPhase	NumDays	2.00	44.00
tblConstructionPhase	PhaseEndDate	10/5/2022	6/10/2023
tblConstructionPhase	PhaseEndDate	5/18/2022	6/30/2022
tblConstructionPhase	PhaseEndDate	10/12/2022	6/30/2023
tblConstructionPhase	PhaseStartDate	5/19/2022	4/3/2023
tblConstructionPhase	PhaseStartDate	5/17/2022	5/2/2022
tblConstructionPhase	PhaseStartDate	10/6/2022	4/3/2023
tblGrading	AcresOfGrading	0.00	0.07
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	4.00	8.00

tblOffRoadEquipment	UsageHours	6.00	8.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	1.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0150	0.1539	0.1282	4.2000e-004	4.0000e-005	5.8300e-003	5.8700e-003	0.0000	5.3700e-003	5.3700e-003	0.0000	36.4845	36.4845	0.0118	0.0000	36.7795
2023	0.0577	0.6041	0.4517	1.1100e-003	0.0000	0.0241	0.0241	0.0000	0.0222	0.0222	0.0000	97.5153	97.5153	0.0313	0.0000	98.2975
Maximum	**0.0577**	**0.6041**	**0.4517**	**1.1100e-003**	**4.0000e-005**	**0.0241**	**0.0241**	**0.0000**	**0.0222**	**0.0222**	**0.0000**	**97.5153**	**97.5153**	**0.0313**	**0.0000**	**98.2975**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0150	0.1539	0.1282	4.2000e-004	2.0000e-005	5.8300e-003	5.8500e-003	0.0000	5.3700e-003	5.3700e-003	0.0000	36.4845	36.4845	0.0118	0.0000	36.7795
2023	0.0577	0.6041	0.4517	1.1100e-003	0.0000	0.0241	0.0241	0.0000	0.0222	0.0222	0.0000	97.5152	97.5152	0.0313	0.0000	98.2974
Maximum	**0.0577**	**0.6041**	**0.4517**	**1.1100e-003**	**2.0000e-005**	**0.0241**	**0.0241**	**0.0000**	**0.0222**	**0.0222**	**0.0000**	**97.5152**	**97.5152**	**0.0313**	**0.0000**	**98.2974**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	50.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	5-2-2022	8-1-2022	0.1645	0.1645
4	2-2-2023	5-1-2023	0.2259	0.2259
5	5-2-2023	8-1-2023	0.4226	0.4226
		Highest	0.4226	0.4226

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Drilling	Grading	5/2/2022	6/30/2022	5	44	
2	Construction	Building Construction	4/3/2023	6/10/2023	5	50	
3	Pipelines	Trenching	4/3/2023	6/30/2023	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.07

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Drilling	Bore/Drill Rigs	1	8.00	221	0.50
Pipelines	Cement and Mortar Mixers	0	6.00	9	0.56
Drilling	Rubber Tired Loaders	1	8.00	203	0.36
Drilling	Concrete/Industrial Saws	0	8.00	81	0.73
Construction	Cranes	1	8.00	231	0.29

Construction	Forklifts	0	6.00	89	0.20
Construction	Cement and Mortar Mixers	1	8.00	9	0.56
Pipelines	Pavers	0	7.00	130	0.42
Pipelines	Rollers	0	7.00	80	0.38
Pipelines	Cranes	1	8.00	231	0.29
Drilling	Rubber Tired Dozers	0	1.00	247	0.40
Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipelines	Excavators	1	8.00	158	0.38
Drilling	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipelines	Graders	1	8.00	187	0.41
Pipelines	Rubber Tired Loaders	1	8.00	203	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Drilling	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Construction	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipelines	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Drilling - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0150	0.1539	0.1282	4.2000e-004		5.8300e-003	5.8300e-003		5.3700e-003	5.3700e-003	0.0000	36.4845	36.4845	0.0118	0.0000	36.7795
Total	**0.0150**	**0.1539**	**0.1282**	**4.2000e-004**	**4.0000e-005**	**5.8300e-003**	**5.8700e-003**	**0.0000**	**5.3700e-003**	**5.3700e-003**	**0.0000**	**36.4845**	**36.4845**	**0.0118**	**0.0000**	**36.7795**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0150	0.1539	0.1282	4.2000e-004		5.8300e-003	5.8300e-003		5.3700e-003	5.3700e-003	0.0000	36.4845	36.4845	0.0118	0.0000	36.7795
Total	**0.0150**	**0.1539**	**0.1282**	**4.2000e-004**	**2.0000e-005**	**5.8300e-003**	**5.8500e-003**	**0.0000**	**5.3700e-003**	**5.3700e-003**	**0.0000**	**36.4845**	**36.4845**	**0.0118**	**0.0000**	**36.7795**

Mitigated Construction Off-Site

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

3.3 Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0140	0.1430	0.1094	2.4000e-004		6.2400e-003	6.2400e-003		5.7700e-003	5.7700e-003	0.0000	20.6591	20.6591	6.4300e-003	0.0000	20.8199
Total	**0.0140**	**0.1430**	**0.1094**	**2.4000e-004**		**6.2400e-003**	**6.2400e-003**		**5.7700e-003**	**5.7700e-003**	**0.0000**	**20.6591**	**20.6591**	**6.4300e-003**	**0.0000**	**20.8199**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0140	0.1430	0.1094	2.4000e-004		6.2400e-003	6.2400e-003		5.7700e-003	5.7700e-003	0.0000	20.6591	20.6591	6.4300e-003	0.0000	20.8199
Total	**0.0140**	**0.1430**	**0.1094**	**2.4000e-004**		**6.2400e-003**	**6.2400e-003**		**5.7700e-003**	**5.7700e-003**	**0.0000**	**20.6591**	**20.6591**	**6.4300e-003**	**0.0000**	**20.8199**

Mitigated Construction Off-Site

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

3.4 Pipelines - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0437	0.4611	0.3423	8.8000e-004		0.0179	0.0179		0.0164	0.0164	0.0000	76.8562	76.8562	0.0249	0.0000	77.4776
Total	**0.0437**	**0.4611**	**0.3423**	**8.8000e-004**		**0.0179**	**0.0179**		**0.0164**	**0.0164**	**0.0000**	**76.8562**	**76.8562**	**0.0249**	**0.0000**	**77.4776**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0437	0.4611	0.3423	8.8000e-004		0.0179	0.0179		0.0164	0.0164	0.0000	76.8561	76.8561	0.0249	0.0000	77.4775
Total	**0.0437**	**0.4611**	**0.3423**	**8.8000e-004**		**0.0179**	**0.0179**		**0.0164**	**0.0164**	**0.0000**	**76.8561**	**76.8561**	**0.0249**	**0.0000**	**77.4775**

Mitigated Construction Off-Site

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

Recovery Wells - Phase 2

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.00	1000sqft	0.07	3,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Grading - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	100.00	50.00
tblConstructionPhase	NumDays	2.00	42.00
tblConstructionPhase	PhaseEndDate	6/7/2023	2/11/2024
tblConstructionPhase	PhaseEndDate	1/18/2023	2/28/2023
tblConstructionPhase	PhaseEndDate	6/14/2023	2/28/2024
tblConstructionPhase	PhaseStartDate	1/19/2023	12/4/2023
tblConstructionPhase	PhaseStartDate	1/17/2023	1/2/2023
tblConstructionPhase	PhaseStartDate	6/8/2023	12/4/2023
tblGrading	AcresOfGrading	0.00	0.07
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	4.00	8.00

tblOffRoadEquipment	UsageHours	6.00	8.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	1.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0325	0.3304	0.2707	7.6000e-004	4.0000e-005	0.0129	0.0129	0.0000	0.0118	0.0118	0.0000	66.7776	66.7776	0.0215	0.0000	67.3150
2024	0.0352	0.3555	0.2891	7.2000e-004	0.0000	0.0140	0.0140	0.0000	0.0129	0.0129	0.0000	63.2402	63.2402	0.0203	0.0000	63.7477
Maximum	**0.0352**	**0.3555**	**0.2891**	**7.6000e-004**	**4.0000e-005**	**0.0140**	**0.0140**	**0.0000**	**0.0129**	**0.0129**	**0.0000**	**66.7776**	**66.7776**	**0.0215**	**0.0000**	**67.3150**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0325	0.3304	0.2707	7.6000e-004	2.0000e-005	0.0129	0.0129	0.0000	0.0118	0.0118	0.0000	66.7775	66.7775	0.0215	0.0000	67.3149
2024	0.0352	0.3555	0.2891	7.2000e-004	0.0000	0.0140	0.0140	0.0000	0.0129	0.0129	0.0000	63.2401	63.2401	0.0203	0.0000	63.7477
Maximum	**0.0352**	**0.3555**	**0.2891**	**7.6000e-004**	**2.0000e-005**	**0.0140**	**0.0140**	**0.0000**	**0.0129**	**0.0129**	**0.0000**	**66.7775**	**66.7775**	**0.0215**	**0.0000**	**67.3149**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	50.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2023	3-31-2023	0.1428	0.1428
4	10-1-2023	12-31-2023	0.2181	0.2181
5	1-1-2024	3-31-2024	0.3846	0.3846
		Highest	0.3846	0.3846

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Drilling	Grading	1/2/2023	2/28/2023	5	42	
2	Construction	Building Construction	12/4/2023	2/11/2024	5	50	
3	Pipelines	Trenching	12/4/2023	2/28/2024	5	63	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.07

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Drilling	Bore/Drill Rigs	1	8.00	221	0.50
Pipelines	Cement and Mortar Mixers	0	6.00	9	0.56
Drilling	Rubber Tired Loaders	1	8.00	203	0.36
Drilling	Concrete/Industrial Saws	0	8.00	81	0.73
Construction	Cranes	1	8.00	231	0.29

Construction	Forklifts	0	6.00	89	0.20
Construction	Cement and Mortar Mixers	1	8.00	9	0.56
Pipelines	Pavers	0	7.00	130	0.42
Pipelines	Rollers	0	7.00	80	0.38
Pipelines	Cranes	1	8.00	231	0.29
Drilling	Rubber Tired Dozers	0	1.00	247	0.40
Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipelines	Excavators	1	8.00	158	0.38
Drilling	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipelines	Graders	1	8.00	187	0.41
Pipelines	Rubber Tired Loaders	1	8.00	203	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Drilling	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Construction	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipelines	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Drilling - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0134	0.1313	0.1216	4.0000e-004		4.8600e-003	4.8600e-003		4.4700e-003	4.4700e-003	0.0000	34.8659	34.8659	0.0113	0.0000	35.1478
Total	**0.0134**	**0.1313**	**0.1216**	**4.0000e-004**	**4.0000e-005**	**4.8600e-003**	**4.9000e-003**	**0.0000**	**4.4700e-003**	**4.4700e-003**	**0.0000**	**34.8659**	**34.8659**	**0.0113**	**0.0000**	**35.1478**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0134	0.1313	0.1216	4.0000e-004		4.8600e-003	4.8600e-003		4.4700e-003	4.4700e-003	0.0000	34.8658	34.8658	0.0113	0.0000	35.1478
Total	**0.0134**	**0.1313**	**0.1216**	**4.0000e-004**	**2.0000e-005**	**4.8600e-003**	**4.8800e-003**	**0.0000**	**4.4700e-003**	**4.4700e-003**	**0.0000**	**34.8658**	**34.8658**	**0.0113**	**0.0000**	**35.1478**

Mitigated Construction Off-Site

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

3.3 Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.6200e-003	0.0572	0.0437	1.0000e-004		2.4900e-003	2.4900e-003		2.3100e-003	2.3100e-003	0.0000	8.2637	8.2637	2.5700e-003	0.0000	8.3280
Total	**5.6200e-003**	**0.0572**	**0.0437**	**1.0000e-004**		**2.4900e-003**	**2.4900e-003**		**2.3100e-003**	**2.3100e-003**	**0.0000**	**8.2637**	**8.2637**	**2.5700e-003**	**0.0000**	**8.3280**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.6200e-003	0.0572	0.0437	1.0000e-004		2.4900e-003	2.4900e-003		2.3100e-003	2.3100e-003	0.0000	8.2637	8.2637	2.5700e-003	0.0000	8.3280
Total	**5.6200e-003**	**0.0572**	**0.0437**	**1.0000e-004**		**2.4900e-003**	**2.4900e-003**		**2.3100e-003**	**2.3100e-003**	**0.0000**	**8.2637**	**8.2637**	**2.5700e-003**	**0.0000**	**8.3280**

Mitigated Construction Off-Site

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

3.3 Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.0200e-003	0.0798	0.0648	1.4000e-004		3.4000e-003	3.4000e-003		3.1400e-003	3.1400e-003	0.0000	12.3979	12.3979	3.8600e-003	0.0000	12.4944
Total	**8.0200e-003**	**0.0798**	**0.0648**	**1.4000e-004**		**3.4000e-003**	**3.4000e-003**		**3.1400e-003**	**3.1400e-003**	**0.0000**	**12.3979**	**12.3979**	**3.8600e-003**	**0.0000**	**12.4944**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.0200e-003	0.0798	0.0648	1.4000e-004		3.4000e-003	3.4000e-003		3.1400e-003	3.1400e-003	0.0000	12.3979	12.3979	3.8600e-003	0.0000	12.4944
Total	**8.0200e-003**	**0.0798**	**0.0648**	**1.4000e-004**		**3.4000e-003**	**3.4000e-003**		**3.1400e-003**	**3.1400e-003**	**0.0000**	**12.3979**	**12.3979**	**3.8600e-003**	**0.0000**	**12.4944**

Mitigated Construction Off-Site

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

3.4 Pipelines - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0134	0.1419	0.1053	2.7000e-004		5.5000e-003	5.5000e-003		5.0600e-003	5.0600e-003	0.0000	23.6481	23.6481	7.6500e-003	0.0000	23.8393
Total	**0.0134**	**0.1419**	**0.1053**	**2.7000e-004**		**5.5000e-003**	**5.5000e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**23.6481**	**23.6481**	**7.6500e-003**	**0.0000**	**23.8393**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0134	0.1419	0.1053	2.7000e-004		5.5000e-003	5.5000e-003		5.0600e-003	5.0600e-003	0.0000	23.6480	23.6480	7.6500e-003	0.0000	23.8392
Total	**0.0134**	**0.1419**	**0.1053**	**2.7000e-004**		**5.5000e-003**	**5.5000e-003**		**5.0600e-003**	**5.0600e-003**	**0.0000**	**23.6480**	**23.6480**	**7.6500e-003**	**0.0000**	**23.8392**

Mitigated Construction Off-Site

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

3.4 Pipelines - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0272	0.2757	0.2244	5.8000e-004		0.0106	0.0106		9.7600e-003	9.7600e-003	0.0000	50.8423	50.8423	0.0164	0.0000	51.2534
Total	**0.0272**	**0.2757**	**0.2244**	**5.8000e-004**		**0.0106**	**0.0106**		**9.7600e-003**	**9.7600e-003**	**0.0000**	**50.8423**	**50.8423**	**0.0164**	**0.0000**	**51.2534**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0272	0.2757	0.2244	5.8000e-004		0.0106	0.0106		9.7600e-003	9.7600e-003	0.0000	50.8422	50.8422	0.0164	0.0000	51.2533
Total	**0.0272**	**0.2757**	**0.2244**	**5.8000e-004**		**0.0106**	**0.0106**		**9.7600e-003**	**9.7600e-003**	**0.0000**	**50.8422**	**50.8422**	**0.0164**	**0.0000**	**51.2533**

Mitigated Construction Off-Site

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

Conveyance Facilities - Kern-San Joaquin County, Annual

Conveyance Facilities

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	21.50	Acre	21.50	936,737.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2026
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - see construction assumptions

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Grading - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value

tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	35.00	800.00
tblConstructionPhase	PhaseEndDate	7/25/2023	5/19/2026
tblConstructionPhase	PhaseStartDate	6/7/2023	4/26/2023
tblGrading	AcresOfGrading	400.00	21.50
tblLandUse	LandUseSquareFeet	936,540.00	936,737.00
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	18.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1417	1.4340	1.2538	2.9200e-003	0.0114	0.0570	0.0684	1.2300e-003	0.0525	0.0538	0.0000	254.8868	254.8868	0.0815	0.0000	256.9253
2024	0.1968	1.9124	1.8336	4.3000e-003	0.0114	0.0756	0.0870	1.2300e-003	0.0697	0.0709	0.0000	375.1828	375.1828	0.1200	0.0000	378.1833
2025	0.1797	1.6467	1.8081	4.2800e-003	0.0114	0.0647	0.0761	1.2300e-003	0.0597	0.0609	0.0000	373.7855	373.7855	0.1196	0.0000	376.7749
2026	0.0682	0.6246	0.6858	1.6200e-003	0.0114	0.0246	0.0360	1.2300e-003	0.0226	0.0239	0.0000	141.7807	141.7807	0.0454	0.0000	142.9146
Maximum	**0.1968**	**1.9124**	**1.8336**	**4.3000e-003**	**0.0114**	**0.0756**	**0.0870**	**1.2300e-003**	**0.0697**	**0.0709**	**0.0000**	**375.1828**	**375.1828**	**0.1200**	**0.0000**	**378.1833**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1417	1.4340	1.2538	2.9200e-003	5.1300e-003	0.0570	0.0621	5.5000e-004	0.0525	0.0531	0.0000	254.8865	254.8865	0.0815	0.0000	256.9250
2024	0.1968	1.9124	1.8336	4.3000e-003	5.1300e-003	0.0756	0.0807	5.5000e-004	0.0697	0.0702	0.0000	375.1823	375.1823	0.1200	0.0000	378.1829
2025	0.1797	1.6467	1.8081	4.2800e-003	5.1300e-003	0.0647	0.0699	5.5000e-004	0.0597	0.0603	0.0000	373.7850	373.7850	0.1196	0.0000	376.7745
2026	0.0682	0.6246	0.6858	1.6200e-003	5.1300e-003	0.0246	0.0297	5.5000e-004	0.0226	0.0232	0.0000	141.7805	141.7805	0.0454	0.0000	142.9145
Maximum	**0.1968**	**1.9124**	**1.8336**	**4.3000e-003**	**5.1300e-003**	**0.0756**	**0.0807**	**5.5000e-004**	**0.0697**	**0.0702**	**0.0000**	**375.1823**	**375.1823**	**0.1200**	**0.0000**	**378.1829**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**55.00**	**0.00**	**9.38**	**55.28**	**0.00**	**1.29**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-26-2023**	**7-25-2023**	0.5754	0.5754
2	**7-26-2023**	**10-25-2023**	0.5817	0.5817
3	**10-26-2023**	**1-25-2024**	0.5674	0.5674
4	**1-26-2024**	**4-25-2024**	0.5233	0.5233
5	**4-26-2024**	**7-25-2024**	0.5233	0.5233
6	**7-26-2024**	**10-25-2024**	0.5290	0.5290
7	**10-26-2024**	**1-25-2025**	0.5102	0.5102
8	**1-26-2025**	**4-25-2025**	0.4498	0.4498
9	**4-26-2025**	**7-25-2025**	0.4548	0.4548
10	**7-26-2025**	**10-25-2025**	0.4598	0.4598
11	**10-26-2025**	**1-25-2026**	0.4598	0.4598
12	**1-26-2026**	**4-25-2026**	0.4498	0.4498
13	**4-26-2026**	**7-25-2026**	0.1200	0.1200
		Highest	0.5817	0.5817

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Canal,Turnout,Pipelines	Grading	4/26/2023	5/19/2026	5	800	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 21.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Canal,Turnout,Pipelines	Cement and Mortar Mixers	1	8.00	9	0.56
Canal,Turnout,Pipelines	Cranes	1	8.00	231	0.29
Canal,Turnout,Pipelines	Rubber Tired Loaders	1	8.00	203	0.36
Canal,Turnout,Pipelines	Excavators	2	8.00	158	0.38
Canal,Turnout,Pipelines	Rubber Tired Dozers	0	8.00	247	0.40
Canal,Turnout,Pipelines	Graders	1	8.00	187	0.41
Canal,Turnout,Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Canal,Turnout,Pipelines	Scrapers	0	8.00	367	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Canal,Turnout,Pipelines	7	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Canal,Turnout,Pipelines - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0114	0.0000	0.0114	1.2300e-003	0.0000	1.2300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1417	1.4340	1.2538	2.9200e-003		0.0570	0.0570		0.0525	0.0525	0.0000	254.8868	254.8868	0.0815	0.0000	256.9253
Total	**0.1417**	**1.4340**	**1.2538**	**2.9200e-003**	**0.0114**	**0.0570**	**0.0684**	**1.2300e-003**	**0.0525**	**0.0537**	**0.0000**	**254.8868**	**254.8868**	**0.0815**	**0.0000**	**256.9253**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.1300e-003	0.0000	5.1300e-003	5.5000e-004	0.0000	5.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1417	1.4340	1.2538	2.9200e-003		0.0570	0.0570		0.0525	0.0525	0.0000	254.8865	254.8865	0.0815	0.0000	256.9250
Total	**0.1417**	**1.4340**	**1.2538**	**2.9200e-003**	**5.1300e-003**	**0.0570**	**0.0621**	**5.5000e-004**	**0.0525**	**0.0531**	**0.0000**	**254.8865**	**254.8865**	**0.0815**	**0.0000**	**256.9250**

Mitigated Construction Off-Site

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

3.2 Canal,Turnout,Pipelines - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0114	0.0000	0.0114	1.2300e-003	0.0000	1.2300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1968	1.9124	1.8336	4.3000e-003		0.0756	0.0756		0.0697	0.0697	0.0000	375.1828	375.1828	0.1200	0.0000	378.1833
Total	**0.1968**	**1.9124**	**1.8336**	**4.3000e-003**	**0.0114**	**0.0756**	**0.0870**	**1.2300e-003**	**0.0697**	**0.0709**	**0.0000**	**375.1828**	**375.1828**	**0.1200**	**0.0000**	**378.1833**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.1300e-003	0.0000	5.1300e-003	5.5000e-004	0.0000	5.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1968	1.9124	1.8336	4.3000e-003		0.0756	0.0756		0.0697	0.0697	0.0000	375.1823	375.1823	0.1200	0.0000	378.1829
Total	**0.1968**	**1.9124**	**1.8336**	**4.3000e-003**	**5.1300e-003**	**0.0756**	**0.0807**	**5.5000e-004**	**0.0697**	**0.0702**	**0.0000**	**375.1823**	**375.1823**	**0.1200**	**0.0000**	**378.1829**

Mitigated Construction Off-Site

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

3.2 Canal,Turnout,Pipelines - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0114	0.0000	0.0114	1.2300e-003	0.0000	1.2300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1797	1.6467	1.8081	4.2800e-003		0.0647	0.0647		0.0597	0.0597	0.0000	373.7855	373.7855	0.1196	0.0000	376.7749
Total	**0.1797**	**1.6467**	**1.8081**	**4.2800e-003**	**0.0114**	**0.0647**	**0.0761**	**1.2300e-003**	**0.0597**	**0.0609**	**0.0000**	**373.7855**	**373.7855**	**0.1196**	**0.0000**	**376.7749**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.1300e-003	0.0000	5.1300e-003	5.5000e-004	0.0000	5.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1797	1.6467	1.8081	4.2800e-003		0.0647	0.0647		0.0597	0.0597	0.0000	373.7850	373.7850	0.1196	0.0000	376.7745
Total	**0.1797**	**1.6467**	**1.8081**	**4.2800e-003**	**5.1300e-003**	**0.0647**	**0.0699**	**5.5000e-004**	**0.0597**	**0.0603**	**0.0000**	**373.7850**	**373.7850**	**0.1196**	**0.0000**	**376.7745**

Mitigated Construction Off-Site

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

3.2 Canal,Turnout,Pipelines - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0114	0.0000	0.0114	1.2300e-003	0.0000	1.2300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0682	0.6246	0.6858	1.6200e-003		0.0246	0.0246		0.0226	0.0226	0.0000	141.7807	141.7807	0.0454	0.0000	142.9146
Total	**0.0682**	**0.6246**	**0.6858**	**1.6200e-003**	**0.0114**	**0.0246**	**0.0360**	**1.2300e-003**	**0.0226**	**0.0239**	**0.0000**	**141.7807**	**141.7807**	**0.0454**	**0.0000**	**142.9146**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.1300e-003	0.0000	5.1300e-003	5.5000e-004	0.0000	5.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0682	0.6246	0.6858	1.6200e-003		0.0246	0.0246		0.0226	0.0226	0.0000	141.7805	141.7805	0.0454	0.0000	142.9145
Total	**0.0682**	**0.6246**	**0.6858**	**1.6200e-003**	**5.1300e-003**	**0.0246**	**0.0297**	**5.5000e-004**	**0.0226**	**0.0232**	**0.0000**	**141.7805**	**141.7805**	**0.0454**	**0.0000**	**142.9145**

Mitigated Construction Off-Site

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

Conveyance - Pump Station - Kern-San Joaquin County, Annual

Conveyance - Pump Station

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.00	1000sqft	0.07	3,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	100.00	221.00

tblConstructionPhase	PhaseEndDate	9/29/2023	2/28/2024
tblConstructionPhase	PhaseStartDate	5/13/2023	4/26/2023
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	1.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0911	0.8850	0.8157	1.8800e-003	0.0000	0.0369	0.0369	0.0000	0.0341	0.0341	0.0000	163.2638	163.2638	0.0519	0.0000	164.5615
2024	0.0209	0.1950	0.1957	4.5000e-004	0.0000	8.0500e-003	8.0500e-003	0.0000	7.4300e-003	7.4300e-003	0.0000	39.4458	39.4458	0.0125	0.0000	39.7594
Maximum	**0.0911**	**0.8850**	**0.8157**	**1.8800e-003**	**0.0000**	**0.0369**	**0.0369**	**0.0000**	**0.0341**	**0.0341**	**0.0000**	**163.2638**	**163.2638**	**0.0519**	**0.0000**	**164.5615**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0911	0.8850	0.8157	1.8800e-003	0.0000	0.0369	0.0369	0.0000	0.0341	0.0341	0.0000	163.2636	163.2636	0.0519	0.0000	164.5613
2024	0.0209	0.1950	0.1957	4.5000e-004	0.0000	8.0500e-003	8.0500e-003	0.0000	7.4300e-003	7.4300e-003	0.0000	39.4458	39.4458	0.0125	0.0000	39.7593
Maximum	**0.0911**	**0.8850**	**0.8157**	**1.8800e-003**	**0.0000**	**0.0369**	**0.0369**	**0.0000**	**0.0341**	**0.0341**	**0.0000**	**163.2636**	**163.2636**	**0.0519**	**0.0000**	**164.5613**

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

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-26-2023	7-25-2023	0.3564	0.3564
2	7-26-2023	10-25-2023	0.3603	0.3603
3	10-26-2023	1-25-2024	0.3521	0.3521
4	1-26-2024	4-25-2024	0.1219	0.1219
		Highest	0.3603	0.3603

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	4/26/2023	2/28/2024	5	221	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.07

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Cement and Mortar Mixers	1	8.00	9	0.56
Building Construction	Excavators	1	8.00	158	0.38
Building Construction	Rubber Tired Loaders	1	8.00	203	0.36
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	0	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0911	0.8850	0.8157	1.8800e-003		0.0369	0.0369		0.0341	0.0341	0.0000	163.2638	163.2638	0.0519	0.0000	164.5615
Total	**0.0911**	**0.8850**	**0.8157**	**1.8800e-003**		**0.0369**	**0.0369**		**0.0341**	**0.0341**	**0.0000**	**163.2638**	**163.2638**	**0.0519**	**0.0000**	**164.5615**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0911	0.8850	0.8157	1.8800e-003		0.0369	0.0369		0.0341	0.0341	0.0000	163.2636	163.2636	0.0519	0.0000	164.5613
Total	**0.0911**	**0.8850**	**0.8157**	**1.8800e-003**		**0.0369**	**0.0369**		**0.0341**	**0.0341**	**0.0000**	**163.2636**	**163.2636**	**0.0519**	**0.0000**	**164.5613**

Mitigated Construction Off-Site

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

3.2 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0209	0.1950	0.1957	4.5000e-004		8.0500e-003	8.0500e-003		7.4300e-003	7.4300e-003	0.0000	39.4458	39.4458	0.0125	0.0000	39.7594
Total	**0.0209**	**0.1950**	**0.1957**	**4.5000e-004**		**8.0500e-003**	**8.0500e-003**		**7.4300e-003**	**7.4300e-003**	**0.0000**	**39.4458**	**39.4458**	**0.0125**	**0.0000**	**39.7594**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0209	0.1950	0.1957	4.5000e-004		8.0500e-003	8.0500e-003		7.4300e-003	7.4300e-003	0.0000	39.4458	39.4458	0.0125	0.0000	39.7593
Total	**0.0209**	**0.1950**	**0.1957**	**4.5000e-004**		**8.0500e-003**	**8.0500e-003**		**7.4300e-003**	**7.4300e-003**	**0.0000**	**39.4458**	**39.4458**	**0.0125**	**0.0000**	**39.7593**

Mitigated Construction Off-Site

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

Recharge Facilities - Phase 1 - Kern-San Joaquin County, Annual

Recharge Facilities - Phase 1

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	640.00	Acre	640.00	27,878,400.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Demolition -

Grading - see construction assumptions

Construction Off-road Equipment Mitigation - see construction assumptions

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	700.00	65.00
tblConstructionPhase	NumDays	1,085.00	216.00
tblConstructionPhase	NumDays	1,085.00	21.00
tblGrading	AcresOfGrading	432.00	590.00
tblGrading	AcresOfGrading	10.50	50.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00

tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripNumber	609.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2648	3.1528	1.6720	4.4500e-003	0.3798	0.1121	0.4919	0.0439	0.1031	0.1470	0.0000	391.0373	391.0373	0.1265	0.0000	394.1991
2022	0.1062	1.2462	0.6760	1.9300e-003	0.3394	0.0427	0.3821	0.0366	0.0393	0.0760	0.0000	169.7850	169.7850	0.0549	0.0000	171.1578
Maximum	**0.2648**	**3.1528**	**1.6720**	**4.4500e-003**	**0.3798**	**0.1121**	**0.4919**	**0.0439**	**0.1031**	**0.1470**	**0.0000**	**391.0373**	**391.0373**	**0.1265**	**0.0000**	**394.1991**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0687	1.4012	2.6582	4.4500e-003	0.1709	7.2900e-003	0.1782	0.0198	7.2900e-003	0.0271	0.0000	391.0369	391.0369	0.1265	0.0000	394.1986
2022	0.0300	0.5933	1.1347	1.9300e-003	0.1527	3.1600e-003	0.1559	0.0165	3.1600e-003	0.0197	0.0000	169.7848	169.7848	0.0549	0.0000	171.1576
Maximum	**0.0687**	**1.4012**	**2.6582**	**4.4500e-003**	**0.1709**	**7.2900e-003**	**0.1782**	**0.0198**	**7.2900e-003**	**0.0271**	**0.0000**	**391.0369**	**391.0369**	**0.1265**	**0.0000**	**394.1986**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	73.39	54.66	-61.53	0.00	55.00	93.25	61.77	55.00	92.66	79.06	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	7-2-2021	10-1-2021	2.2920	1.0175
2	10-2-2021	1-1-2022	1.1314	0.4553
3	1-2-2022	4-1-2022	0.9659	0.4466
4	4-2-2022	7-1-2022	0.3882	0.1775
		Highest	2.2920	1.0175

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/2/2021	9/30/2021	5	65	
2	Basins	Grading	7/2/2021	4/30/2022	5	216	
3	Pipelines	Trenching	7/2/2021	9/30/2021	5	65	
4	Restoration	Grading	4/1/2022	4/30/2022	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 640

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	2	8.00	158	0.38
Demolition	Graders	1	8.00	187	0.41

Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Rubber Tired Loaders	1	8.00	203	0.36
Pipelines	Cranes	1	8.00	231	0.29
Pipelines	Excavators	1	8.00	158	0.38
Pipelines	Graders	1	8.00	187	0.41
Pipelines	Rubber Tired Dozers	0	8.00	247	0.40
Pipelines	Rubber Tired Loaders	1	8.00	203	0.36
Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Basins	Excavators	2	8.00	158	0.38
Basins	Graders	4	8.00	187	0.41
Basins	Rubber Tired Dozers	0	8.00	247	0.40
Basins	Rubber Tired Loaders	1	8.00	203	0.36
Basins	Scrapers	0	8.00	367	0.48
Basins	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Restoration	Air Compressors	0	6.00	78	0.48
Restoration	Excavators	0	8.00	158	0.38
Restoration	Graders	1	8.00	187	0.41
Restoration	Rubber Tired Dozers	0	8.00	247	0.40
Restoration	Scrapers	0	8.00	367	0.48
Restoration	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipelines	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Basins	7	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Restoration	2	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0669	0.0000	0.0669	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0408	0.4581	0.3221	7.5000e-004		0.0171	0.0171		0.0157	0.0157	0.0000	66.2581	66.2581	0.0214	0.0000	66.7938
Total	**0.0408**	**0.4581**	**0.3221**	**7.5000e-004**	**0.0669**	**0.0171**	**0.0840**	**0.0101**	**0.0157**	**0.0259**	**0.0000**	**66.2581**	**66.2581**	**0.0214**	**0.0000**	**66.7938**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0301	0.0000	0.0301	4.5600e-003	0.0000	4.5600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0110	0.2587	0.4779	7.5000e-004		1.2400e-003	1.2400e-003		1.2400e-003	1.2400e-003	0.0000	66.2580	66.2580	0.0214	0.0000	66.7938
Total	**0.0110**	**0.2587**	**0.4779**	**7.5000e-004**	**0.0301**	**1.2400e-003**	**0.0314**	**4.5600e-003**	**1.2400e-003**	**5.8000e-003**	**0.0000**	**66.2580**	**66.2580**	**0.0214**	**0.0000**	**66.7938**

Mitigated Construction Off-Site

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

3.3 Basins - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3129	0.0000	0.3129	0.0338	0.0000	0.0338	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1712	2.0874	0.9963	2.8200e-003		0.0713	0.0713		0.0656	0.0656	0.0000	247.9233	247.9233	0.0802	0.0000	249.9279
Total	**0.1712**	**2.0874**	**0.9963**	**2.8200e-003**	**0.3129**	**0.0713**	**0.3842**	**0.0338**	**0.0656**	**0.0994**	**0.0000**	**247.9233**	**247.9233**	**0.0802**	**0.0000**	**249.9279**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1408	0.0000	0.1408	0.0152	0.0000	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0434	0.8642	1.6539	2.8200e-003		4.6200e-003	4.6200e-003		4.6200e-003	4.6200e-003	0.0000	247.9231	247.9231	0.0802	0.0000	249.9276
Total	**0.0434**	**0.8642**	**1.6539**	**2.8200e-003**	**0.1408**	**4.6200e-003**	**0.1454**	**0.0152**	**4.6200e-003**	**0.0198**	**0.0000**	**247.9231**	**247.9231**	**0.0802**	**0.0000**	**249.9276**

Mitigated Construction Off-Site

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

3.3 Basins - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3129	0.0000	0.3129	0.0338	0.0000	0.0338	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1001	1.1734	0.6345	1.8300e-003		0.0400	0.0400		0.0368	0.0368	0.0000	160.8071	160.8071	0.0520	0.0000	162.1073
Total	**0.1001**	**1.1734**	**0.6345**	**1.8300e-003**	**0.3129**	**0.0400**	**0.3529**	**0.0338**	**0.0368**	**0.0706**	**0.0000**	**160.8071**	**160.8071**	**0.0520**	**0.0000**	**162.1073**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1408	0.0000	0.1408	0.0152	0.0000	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0282	0.5607	1.0731	1.8300e-003		3.0000e-003	3.0000e-003		3.0000e-003	3.0000e-003	0.0000	160.8069	160.8069	0.0520	0.0000	162.1071
Total	**0.0282**	**0.5607**	**1.0731**	**1.8300e-003**	**0.1408**	**3.0000e-003**	**0.1438**	**0.0152**	**3.0000e-003**	**0.0182**	**0.0000**	**160.8069**	**160.8069**	**0.0520**	**0.0000**	**162.1071**

Mitigated Construction Off-Site

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

3.4 Pipelines - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0528	0.6073	0.3536	8.7000e-004		0.0237	0.0237		0.0218	0.0218	0.0000	76.8559	76.8559	0.0249	0.0000	77.4773
Total	**0.0528**	**0.6073**	**0.3536**	**8.7000e-004**		**0.0237**	**0.0237**		**0.0218**	**0.0218**	**0.0000**	**76.8559**	**76.8559**	**0.0249**	**0.0000**	**77.4773**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0143	0.2783	0.5265	8.7000e-004		1.4300e-003	1.4300e-003		1.4300e-003	1.4300e-003	0.0000	76.8558	76.8558	0.0249	0.0000	77.4772
Total	**0.0143**	**0.2783**	**0.5265**	**8.7000e-004**		**1.4300e-003**	**1.4300e-003**		**1.4300e-003**	**1.4300e-003**	**0.0000**	**76.8558**	**76.8558**	**0.0249**	**0.0000**	**77.4772**

Mitigated Construction Off-Site

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

3.5 Restoration - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0265	0.0000	0.0265	2.8600e-003	0.0000	2.8600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0900e-003	0.0728	0.0416	1.0000e-004		2.7000e-003	2.7000e-003		2.4900e-003	2.4900e-003	0.0000	8.9779	8.9779	2.9000e-003	0.0000	9.0505
Total	**6.0900e-003**	**0.0728**	**0.0416**	**1.0000e-004**	**0.0265**	**2.7000e-003**	**0.0292**	**2.8600e-003**	**2.4900e-003**	**5.3500e-003**	**0.0000**	**8.9779**	**8.9779**	**2.9000e-003**	**0.0000**	**9.0505**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0119	0.0000	0.0119	1.2900e-003	0.0000	1.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8700e-003	0.0325	0.0615	1.0000e-004		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004	0.0000	8.9779	8.9779	2.9000e-003	0.0000	9.0505
Total	**1.8700e-003**	**0.0325**	**0.0615**	**1.0000e-004**	**0.0119**	**1.7000e-004**	**0.0121**	**1.2900e-003**	**1.7000e-004**	**1.4600e-003**	**0.0000**	**8.9779**	**8.9779**	**2.9000e-003**	**0.0000**	**9.0505**

Mitigated Construction Off-Site

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

Recharge Facilities - Phase 2 - Kern-San Joaquin County, Annual

Recharge Facilities - Phase 2

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	640.00	Acre	640.00	27,878,400.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod.

Demolition -

Grading - see construction assumptions

Construction Off-road Equipment Mitigation - see construction assumptions

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	700.00	67.00
tblConstructionPhase	NumDays	1,085.00	220.00
tblConstructionPhase	NumDays	1,085.00	22.00
tblGrading	AcresOfGrading	440.00	590.00
tblGrading	AcresOfGrading	11.00	50.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00

tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripNumber	609.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.3512	4.0431	2.3692	6.5200e-003	0.4063	0.1419	0.5482	0.0468	0.1306	0.1774	0.0000	573.1284	573.1284	0.1854	0.0000	577.7624
Maximum	**0.3512**	**4.0431**	**2.3692**	**6.5200e-003**	**0.4063**	**0.1419**	**0.5482**	**0.0468**	**0.1306**	**0.1774**	**0.0000**	**573.1284**	**573.1284**	**0.1854**	**0.0000**	**577.7624**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1009	2.0389	3.8772	6.5200e-003	0.1828	0.0107	0.1935	0.0211	0.0107	0.0317	0.0000	573.1277	573.1277	0.1854	0.0000	577.7618
Maximum	**0.1009**	**2.0389**	**3.8772**	**6.5200e-003**	**0.1828**	**0.0107**	**0.1935**	**0.0211**	**0.0107**	**0.0317**	**0.0000**	**573.1277**	**573.1277**	**0.1854**	**0.0000**	**577.7618**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**71.27**	**49.57**	**-63.65**	**0.00**	**55.00**	**92.47**	**64.70**	**55.00**	**91.81**	**82.10**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**2-28-2022**	**5-27-2022**	1.9160	0.9903
2	**5-28-2022**	**8-27-2022**	1.0279	0.4800
3	**8-28-2022**	**9-30-2022**	0.3639	0.1683
		Highest	1.9160	0.9903

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	2/28/2022	5/31/2022	5	67	
2	Basins	Grading	2/28/2022	12/31/2022	5	220	
3	Pipelines	Trenching	2/28/2022	5/31/2022	5	67	
4	Restoration	Grading	12/1/2022	12/31/2022	5	22	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 640

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	2	8.00	158	0.38
Demolition	Graders	1	8.00	187	0.41

Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Rubber Tired Loaders	1	8.00	203	0.36
Pipelines	Cranes	1	8.00	231	0.29
Pipelines	Excavators	1	8.00	158	0.38
Pipelines	Graders	1	8.00	187	0.41
Pipelines	Rubber Tired Dozers	0	8.00	247	0.40
Pipelines	Rubber Tired Loaders	1	8.00	203	0.36
Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Basins	Excavators	2	8.00	158	0.38
Basins	Graders	4	8.00	187	0.41
Basins	Rubber Tired Dozers	0	8.00	247	0.40
Basins	Rubber Tired Loaders	1	8.00	203	0.36
Basins	Scrapers	0	8.00	367	0.48
Basins	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Restoration	Air Compressors	0	6.00	78	0.48
Restoration	Excavators	0	8.00	158	0.38
Restoration	Graders	1	8.00	187	0.41
Restoration	Rubber Tired Dozers	0	8.00	247	0.40
Restoration	Scrapers	0	8.00	367	0.48
Restoration	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipelines	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Basins	7	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Restoration	2	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0669	0.0000	0.0669	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0372	0.3965	0.3271	7.8000e-004		0.0148	0.0148		0.0136	0.0136	0.0000	68.2871	68.2871	0.0221	0.0000	68.8392
Total	**0.0372**	**0.3965**	**0.3271**	**7.8000e-004**	**0.0669**	**0.0148**	**0.0817**	**0.0101**	**0.0136**	**0.0237**	**0.0000**	**68.2871**	**68.2871**	**0.0221**	**0.0000**	**68.8392**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0301	0.0000	0.0301	4.5600e-003	0.0000	4.5600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0113	0.2667	0.4926	7.8000e-004		1.2800e-003	1.2800e-003		1.2800e-003	1.2800e-003	0.0000	68.2870	68.2870	0.0221	0.0000	68.8391
Total	**0.0113**	**0.2667**	**0.4926**	**7.8000e-004**	**0.0301**	**1.2800e-003**	**0.0314**	**4.5600e-003**	**1.2800e-003**	**5.8400e-003**	**0.0000**	**68.2870**	**68.2870**	**0.0221**	**0.0000**	**68.8391**

Mitigated Construction Off-Site

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

3.3 Basins - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3129	0.0000	0.3129	0.0338	0.0000	0.0338	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2592	3.0370	1.6421	4.7400e-003		0.1036	0.1036		0.0953	0.0953	0.0000	416.2065	416.2065	0.1346	0.0000	419.5718
Total	**0.2592**	**3.0370**	**1.6421**	**4.7400e-003**	**0.3129**	**0.1036**	**0.4165**	**0.0338**	**0.0953**	**0.1291**	**0.0000**	**416.2065**	**416.2065**	**0.1346**	**0.0000**	**419.5718**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1408	0.0000	0.1408	0.0152	0.0000	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0729	1.4513	2.7775	4.7400e-003		7.7600e-003	7.7600e-003		7.7600e-003	7.7600e-003	0.0000	416.2060	416.2060	0.1346	0.0000	419.5713
Total	**0.0729**	**1.4513**	**2.7775**	**4.7400e-003**	**0.1408**	**7.7600e-003**	**0.1485**	**0.0152**	**7.7600e-003**	**0.0230**	**0.0000**	**416.2060**	**416.2060**	**0.1346**	**0.0000**	**419.5713**

Mitigated Construction Off-Site

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

3.4 Pipelines - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0485	0.5333	0.3564	9.0000e-004		0.0207	0.0207		0.0191	0.0191	0.0000	79.2294	79.2294	0.0256	0.0000	79.8700
Total	**0.0485**	**0.5333**	**0.3564**	**9.0000e-004**		**0.0207**	**0.0207**		**0.0191**	**0.0191**	**0.0000**	**79.2294**	**79.2294**	**0.0256**	**0.0000**	**79.8700**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0147	0.2868	0.5427	9.0000e-004		1.4800e-003	1.4800e-003		1.4800e-003	1.4800e-003	0.0000	79.2293	79.2293	0.0256	0.0000	79.8699
Total	**0.0147**	**0.2868**	**0.5427**	**9.0000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**79.2293**	**79.2293**	**0.0256**	**0.0000**	**79.8699**

Mitigated Construction Off-Site

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

3.5 Restoration - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0265	0.0000	0.0265	2.8600e-003	0.0000	2.8600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.3800e-003	0.0763	0.0436	1.1000e-004		2.8300e-003	2.8300e-003		2.6000e-003	2.6000e-003	0.0000	9.4054	9.4054	3.0400e-003	0.0000	9.4815
Total	**6.3800e-003**	**0.0763**	**0.0436**	**1.1000e-004**	**0.0265**	**2.8300e-003**	**0.0293**	**2.8600e-003**	**2.6000e-003**	**5.4600e-003**	**0.0000**	**9.4054**	**9.4054**	**3.0400e-003**	**0.0000**	**9.4815**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0119	0.0000	0.0119	1.2900e-003	0.0000	1.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9600e-003	0.0341	0.0644	1.1000e-004		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004	0.0000	9.4054	9.4054	3.0400e-003	0.0000	9.4815
Total	**1.9600e-003**	**0.0341**	**0.0644**	**1.1000e-004**	**0.0119**	**1.7000e-004**	**0.0121**	**1.2900e-003**	**1.7000e-004**	**1.4600e-003**	**0.0000**	**9.4054**	**9.4054**	**3.0400e-003**	**0.0000**	**9.4815**

Mitigated Construction Off-Site

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

Recovery Wells - Phase 1

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.00	1000sqft	0.07	3,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Grading - see construction assumptions

Construction Off-road Equipment Mitigation - see construction assumptions

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	100.00	50.00
tblConstructionPhase	NumDays	2.00	44.00
tblGrading	AcresOfGrading	0.00	0.07
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	1.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0150	0.1533	0.1278	4.1000e-004	4.0000e-005	5.8200e-003	5.8500e-003	0.0000	5.3500e-003	5.3500e-003	0.0000	36.3329	36.3329	0.0118	0.0000	36.6267
2023	0.0578	0.6047	0.4514	1.1200e-003	0.0000	0.0241	0.0241	0.0000	0.0222	0.0222	0.0000	97.5202	97.5202	0.0313	0.0000	98.3024
Maximum	**0.0578**	**0.6047**	**0.4514**	**1.1200e-003**	**4.0000e-005**	**0.0241**	**0.0241**	**0.0000**	**0.0222**	**0.0222**	**0.0000**	**97.5202**	**97.5202**	**0.0313**	**0.0000**	**98.3024**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	7.2300e-003	0.1217	0.2367	4.1000e-004	2.0000e-005	6.8000e-004	7.0000e-004	0.0000	6.8000e-004	6.8000e-004	0.0000	36.3329	36.3329	0.0118	0.0000	36.6267
2023	0.0198	0.3595	0.6695	1.1200e-003	0.0000	2.1500e-003	2.1500e-003	0.0000	2.1500e-003	2.1500e-003	0.0000	97.5201	97.5201	0.0313	0.0000	98.3023
Maximum	**0.0198**	**0.3595**	**0.6695**	**1.1200e-003**	**2.0000e-005**	**2.1500e-003**	**2.1500e-003**	**0.0000**	**2.1500e-003**	**2.1500e-003**	**0.0000**	**97.5201**	**97.5201**	**0.0313**	**0.0000**	**98.3023**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**62.78**	**36.53**	**-56.45**	**0.00**	**50.00**	**90.55**	**90.49**	**0.00**	**89.74**	**89.74**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)

1	**5-2-2022**	**8-1-2022**	0.1639	0.1256
4	**2-2-2023**	**5-1-2023**	0.2261	0.1292
5	**5-2-2023**	**8-1-2023**	0.4230	0.2425
		Highest	0.4230	0.2425

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Drilling	Grading	5/2/2022	6/30/2022	5	44	
2	Pipelines	Trenching	4/3/2023	6/30/2023	5	65	
3	Construction	Building Construction	4/3/2023	6/10/2023	5	50	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.07

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Drilling	Bore/Drill Rigs	1	8.00	221	0.50
Drilling	Concrete/Industrial Saws	0	8.00	81	0.73
Drilling	Rubber Tired Dozers	0	1.00	247	0.40
Drilling	Rubber Tired Loaders	1	8.00	203	0.36
Drilling	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Construction	Cement and Mortar Mixers	1	8.00	9	0.56
Construction	Cranes	1	8.00	231	0.29
Construction	Forklifts	0	6.00	89	0.20
Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Pipelines	Cement and Mortar Mixers	0	6.00	9	0.56
Pipelines	Cranes	1	8.00	231	0.29
Pipelines	Excavators	1	8.00	158	0.38
Pipelines	Graders	1	8.00	187	0.41
Pipelines	Pavers	0	7.00	130	0.42
Pipelines	Rollers	0	7.00	80	0.38
Pipelines	Rubber Tired Loaders	1	8.00	203	0.36
Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Drilling	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Construction	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipelines	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Drilling - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0150	0.1533	0.1278	4.1000e-004		5.8200e-003	5.8200e-003		5.3500e-003	5.3500e-003	0.0000	36.3329	36.3329	0.0118	0.0000	36.6267
Total	**0.0150**	**0.1533**	**0.1278**	**4.1000e-004**	**4.0000e-005**	**5.8200e-003**	**5.8600e-003**	**0.0000**	**5.3500e-003**	**5.3500e-003**	**0.0000**	**36.3329**	**36.3329**	**0.0118**	**0.0000**	**36.6267**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.2300e-003	0.1217	0.2367	4.1000e-004		6.8000e-004	6.8000e-004		6.8000e-004	6.8000e-004	0.0000	36.3329	36.3329	0.0118	0.0000	36.6267
Total	**7.2300e-003**	**0.1217**	**0.2367**	**4.1000e-004**	**2.0000e-005**	**6.8000e-004**	**7.0000e-004**	**0.0000**	**6.8000e-004**	**6.8000e-004**	**0.0000**	**36.3329**	**36.3329**	**0.0118**	**0.0000**	**36.6267**

Mitigated Construction Off-Site

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

3.3 Pipelines - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0437	0.4617	0.3421	8.8000e-004		0.0179	0.0179		0.0165	0.0165	0.0000	76.8611	76.8611	0.0249	0.0000	77.4825
Total	**0.0437**	**0.4617**	**0.3421**	**8.8000e-004**		**0.0179**	**0.0179**		**0.0165**	**0.0165**	**0.0000**	**76.8611**	**76.8611**	**0.0249**	**0.0000**	**77.4825**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0143	0.2783	0.5265	8.8000e-004		1.4300e-003	1.4300e-003		1.4300e-003	1.4300e-003	0.0000	76.8610	76.8610	0.0249	0.0000	77.4824
Total	**0.0143**	**0.2783**	**0.5265**	**8.8000e-004**		**1.4300e-003**	**1.4300e-003**		**1.4300e-003**	**1.4300e-003**	**0.0000**	**76.8610**	**76.8610**	**0.0249**	**0.0000**	**77.4824**

Mitigated Construction Off-Site

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

3.4 Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0140	0.1430	0.1094	2.4000e-004		6.2400e-003	6.2400e-003		5.7700e-003	5.7700e-003	0.0000	20.6591	20.6591	6.4300e-003	0.0000	20.8199
Total	**0.0140**	**0.1430**	**0.1094**	**2.4000e-004**		**6.2400e-003**	**6.2400e-003**		**5.7700e-003**	**5.7700e-003**	**0.0000**	**20.6591**	**20.6591**	**6.4300e-003**	**0.0000**	**20.8199**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.5700e-003	0.0812	0.1431	2.4000e-004		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	20.6591	20.6591	6.4300e-003	0.0000	20.8199
Total	**5.5700e-003**	**0.0812**	**0.1431**	**2.4000e-004**		**7.2000e-004**	**7.2000e-004**		**7.2000e-004**	**7.2000e-004**	**0.0000**	**20.6591**	**20.6591**	**6.4300e-003**	**0.0000**	**20.8199**

Mitigated Construction Off-Site

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

Recovery Wells - Phase 2 - Kern-San Joaquin County, Annual

Recovery Wells - Phase 2

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.00	1000sqft	0.07	3,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Grading - see construction assumptions

Construction Off-road Equipment Mitigation - see construction assumptions

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	100.00	50.00
tblConstructionPhase	NumDays	2.00	42.00
tblGrading	AcresOfGrading	0.00	0.07
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	1.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0325	0.3301	0.2703	7.6000e-004	4.0000e-005	0.0129	0.0129	0.0000	0.0118	0.0118	0.0000	66.6342	66.6342	0.0215	0.0000	67.1705
2024	0.0352	0.3559	0.2890	7.2000e-004	0.0000	0.0140	0.0140	0.0000	0.0129	0.0129	0.0000	63.2434	63.2434	0.0203	0.0000	63.7509
Maximum	**0.0352**	**0.3559**	**0.2890**	**7.6000e-004**	**4.0000e-005**	**0.0140**	**0.0140**	**0.0000**	**0.0129**	**0.0129**	**0.0000**	**66.6342**	**66.6342**	**0.0215**	**0.0000**	**67.1705**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0135	0.2343	0.4452	7.6000e-004	2.0000e-005	1.3800e-003	1.4000e-003	0.0000	1.3800e-003	1.3800e-003	0.0000	66.6341	66.6341	0.0215	0.0000	67.1704
2024	0.0128	0.2328	0.4341	7.2000e-004	0.0000	1.3800e-003	1.3800e-003	0.0000	1.3800e-003	1.3800e-003	0.0000	63.2433	63.2433	0.0203	0.0000	63.7509
Maximum	**0.0135**	**0.2343**	**0.4452**	**7.6000e-004**	**2.0000e-005**	**1.3800e-003**	**1.4000e-003**	**0.0000**	**1.3800e-003**	**1.3800e-003**	**0.0000**	**66.6341**	**66.6341**	**0.0215**	**0.0000**	**67.1704**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**61.12**	**31.91**	**-57.23**	**0.00**	**50.00**	**89.73**	**89.67**	**0.00**	**88.85**	**88.85**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)

1	**1-1-2023**	**3-31-2023**	0.1422	0.1214
4	**10-1-2023**	**12-31-2023**	0.2183	0.1247
5	**1-1-2024**	**3-31-2024**	0.3850	0.2417
		Highest	0.3850	0.2417

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Drilling	Grading	1/2/2023	2/28/2023	5	42	
2	Pipelines	Trenching	12/4/2023	2/28/2024	5	63	
3	Construction	Building Construction	12/4/2023	2/11/2024	5	50	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.07

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Drilling	Bore/Drill Rigs	1	8.00	221	0.50
Drilling	Concrete/Industrial Saws	0	8.00	81	0.73
Drilling	Rubber Tired Dozers	0	1.00	247	0.40
Drilling	Rubber Tired Loaders	1	8.00	203	0.36
Drilling	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Construction	Cement and Mortar Mixers	1	8.00	9	0.56
Construction	Cranes	1	8.00	231	0.29
Construction	Forklifts	0	6.00	89	0.20
Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Pipelines	Cement and Mortar Mixers	0	6.00	9	0.56
Pipelines	Cranes	1	8.00	231	0.29
Pipelines	Excavators	1	8.00	158	0.38
Pipelines	Graders	1	8.00	187	0.41
Pipelines	Pavers	0	7.00	130	0.42
Pipelines	Rollers	0	7.00	80	0.38
Pipelines	Rubber Tired Loaders	1	8.00	203	0.36
Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Drilling	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Construction	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipelines	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Drilling - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0134	0.1308	0.1213	4.0000e-004		4.8500e-003	4.8500e-003		4.4600e-003	4.4600e-003	0.0000	34.7210	34.7210	0.0112	0.0000	35.0017
Total	**0.0134**	**0.1308**	**0.1213**	**4.0000e-004**	**4.0000e-005**	**4.8500e-003**	**4.8900e-003**	**0.0000**	**4.4600e-003**	**4.4600e-003**	**0.0000**	**34.7210**	**34.7210**	**0.0112**	**0.0000**	**35.0017**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.9000e-003	0.1162	0.2260	4.0000e-004		6.5000e-004	6.5000e-004		6.5000e-004	6.5000e-004	0.0000	34.7210	34.7210	0.0112	0.0000	35.0017
Total	**6.9000e-003**	**0.1162**	**0.2260**	**4.0000e-004**	**2.0000e-005**	**6.5000e-004**	**6.7000e-004**	**0.0000**	**6.5000e-004**	**6.5000e-004**	**0.0000**	**34.7210**	**34.7210**	**0.0112**	**0.0000**	**35.0017**

Mitigated Construction Off-Site

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

3.3 Pipelines - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0135	0.1421	0.1053	2.7000e-004		5.5100e-003	5.5100e-003		5.0700e-003	5.0700e-003	0.0000	23.6496	23.6496	7.6500e-003	0.0000	23.8408
Total	**0.0135**	**0.1421**	**0.1053**	**2.7000e-004**		**5.5100e-003**	**5.5100e-003**		**5.0700e-003**	**5.0700e-003**	**0.0000**	**23.6496**	**23.6496**	**7.6500e-003**	**0.0000**	**23.8408**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.3900e-003	0.0856	0.1620	2.7000e-004		4.4000e-004	4.4000e-004		4.4000e-004	4.4000e-004	0.0000	23.6495	23.6495	7.6500e-003	0.0000	23.8408
Total	**4.3900e-003**	**0.0856**	**0.1620**	**2.7000e-004**		**4.4000e-004**	**4.4000e-004**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**23.6495**	**23.6495**	**7.6500e-003**	**0.0000**	**23.8408**

Mitigated Construction Off-Site

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

3.3 Pipelines - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0272	0.2760	0.2242	5.8000e-004		0.0106	0.0106		9.7700e-003	9.7700e-003	0.0000	50.8455	50.8455	0.0164	0.0000	51.2566
Total	**0.0272**	**0.2760**	**0.2242**	**5.8000e-004**		**0.0106**	**0.0106**		**9.7700e-003**	**9.7700e-003**	**0.0000**	**50.8455**	**50.8455**	**0.0164**	**0.0000**	**51.2566**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.4400e-003	0.1841	0.3483	5.8000e-004		9.5000e-004	9.5000e-004		9.5000e-004	9.5000e-004	0.0000	50.8454	50.8454	0.0164	0.0000	51.2565
Total	**9.4400e-003**	**0.1841**	**0.3483**	**5.8000e-004**		**9.5000e-004**	**9.5000e-004**		**9.5000e-004**	**9.5000e-004**	**0.0000**	**50.8454**	**50.8454**	**0.0164**	**0.0000**	**51.2565**

Mitigated Construction Off-Site

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

3.4 Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.6200e-003	0.0572	0.0437	1.0000e-004		2.4900e-003	2.4900e-003		2.3100e-003	2.3100e-003	0.0000	8.2637	8.2637	2.5700e-003	0.0000	8.3280
Total	**5.6200e-003**	**0.0572**	**0.0437**	**1.0000e-004**		**2.4900e-003**	**2.4900e-003**		**2.3100e-003**	**2.3100e-003**	**0.0000**	**8.2637**	**8.2637**	**2.5700e-003**	**0.0000**	**8.3280**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.2300e-003	0.0325	0.0572	1.0000e-004		2.9000e-004	2.9000e-004		2.9000e-004	2.9000e-004	0.0000	8.2637	8.2637	2.5700e-003	0.0000	8.3280
Total	**2.2300e-003**	**0.0325**	**0.0572**	**1.0000e-004**		**2.9000e-004**	**2.9000e-004**		**2.9000e-004**	**2.9000e-004**	**0.0000**	**8.2637**	**8.2637**	**2.5700e-003**	**0.0000**	**8.3280**

Mitigated Construction Off-Site

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

3.4 Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.0200e-003	0.0798	0.0648	1.4000e-004		3.4000e-003	3.4000e-003		3.1400e-003	3.1400e-003	0.0000	12.3979	12.3979	3.8600e-003	0.0000	12.4944
Total	**8.0200e-003**	**0.0798**	**0.0648**	**1.4000e-004**		**3.4000e-003**	**3.4000e-003**		**3.1400e-003**	**3.1400e-003**	**0.0000**	**12.3979**	**12.3979**	**3.8600e-003**	**0.0000**	**12.4944**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.3400e-003	0.0487	0.0858	1.4000e-004		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	12.3979	12.3979	3.8600e-003	0.0000	12.4944
Total	**3.3400e-003**	**0.0487**	**0.0858**	**1.4000e-004**		**4.3000e-004**	**4.3000e-004**		**4.3000e-004**	**4.3000e-004**	**0.0000**	**12.3979**	**12.3979**	**3.8600e-003**	**0.0000**	**12.4944**

Mitigated Construction Off-Site

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

Conveyance Facilities - Kern-San Joaquin County, Annual

Conveyance Facilities

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	21.50	Acre	21.50	936,737.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2026
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - see construction assumptions

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Grading - see construction assumptions

Construction Off-road Equipment Mitigation - see construction assumptions

Table Name	Column Name	Default Value	New Value

tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	35.00	800.00
tblGrading	AcresOfGrading	400.00	21.50
tblLandUse	LandUseSquareFeet	936,540.00	936,737.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	18.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1418	1.4351	1.2542	2.9200e-003	0.0114	0.0570	0.0684	1.2300e-003	0.0526	0.0538	0.0000	254.9380	254.9380	0.0816	0.0000	256.9769
2024	0.1970	1.9139	1.8342	4.3000e-003	0.0114	0.0756	0.0870	1.2300e-003	0.0697	0.0710	0.0000	375.2581	375.2581	0.1201	0.0000	378.2593
2025	0.1798	1.6482	1.8086	4.2800e-003	0.0114	0.0648	0.0762	1.2300e-003	0.0598	0.0610	0.0000	373.8605	373.8605	0.1196	0.0000	376.8505
2026	0.0682	0.6252	0.6860	1.6200e-003	0.0114	0.0246	0.0360	1.2300e-003	0.0227	0.0239	0.0000	141.8091	141.8091	0.0454	0.0000	142.9433
Maximum	**0.1970**	**1.9139**	**1.8342**	**4.3000e-003**	**0.0114**	**0.0756**	**0.0870**	**1.2300e-003**	**0.0697**	**0.0710**	**0.0000**	**375.2581**	**375.2581**	**0.1201**	**0.0000**	**378.2593**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0500	0.9975	1.8179	2.9200e-003	5.1300e-003	5.9500e-003	0.0111	5.5000e-004	5.9500e-003	6.5100e-003	0.0000	254.9377	254.9377	0.0816	0.0000	256.9766
2024	0.0735	1.4682	2.6757	4.3000e-003	5.1300e-003	8.7600e-003	0.0139	5.5000e-004	8.7600e-003	9.3200e-003	0.0000	375.2576	375.2576	0.1201	0.0000	378.2588
2025	0.0733	1.4626	2.6655	4.2800e-003	5.1300e-003	8.7300e-003	0.0139	5.5000e-004	8.7300e-003	9.2800e-003	0.0000	373.8600	373.8600	0.1196	0.0000	376.8500
2026	0.0278	0.5548	1.0111	1.6200e-003	5.1300e-003	3.3100e-003	8.4400e-003	5.5000e-004	3.3100e-003	3.8700e-003	0.0000	141.8090	141.8090	0.0454	0.0000	142.9431
Maximum	**0.0735**	**1.4682**	**2.6757**	**4.3000e-003**	**5.1300e-003**	**8.7600e-003**	**0.0139**	**5.5000e-004**	**8.7600e-003**	**9.3200e-003**	**0.0000**	**375.2576**	**375.2576**	**0.1201**	**0.0000**	**378.2588**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**61.73**	**20.27**	**-46.34**	**0.00**	**55.00**	**87.95**	**82.34**	**55.28**	**86.93**	**86.18**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-26-2023	7-25-2023	0.5758	0.3825
2	7-26-2023	10-25-2023	0.5821	0.3867
3	10-26-2023	1-25-2024	0.5678	0.3867
4	1-26-2024	4-25-2024	0.5237	0.3825
5	4-26-2024	7-25-2024	0.5237	0.3825
6	7-26-2024	10-25-2024	0.5294	0.3867
7	10-26-2024	1-25-2025	0.5106	0.3867
8	1-26-2025	4-25-2025	0.4502	0.3783
9	4-26-2025	7-25-2025	0.4552	0.3825
10	7-26-2025	10-25-2025	0.4602	0.3867
11	10-26-2025	1-25-2026	0.4602	0.3867
12	1-26-2026	4-25-2026	0.4502	0.3783
13	4-26-2026	7-25-2026	0.1201	0.1009
		Highest	0.5821	0.3867

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Canal,Turnout,Pipelines	Grading	4/26/2023	5/19/2026	5	800	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 21.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Canal,Turnout,Pipelines	Cement and Mortar Mixers	1	8.00	9	0.56
Canal,Turnout,Pipelines	Cranes	1	8.00	231	0.29
Canal,Turnout,Pipelines	Excavators	2	8.00	158	0.38
Canal,Turnout,Pipelines	Graders	1	8.00	187	0.41
Canal,Turnout,Pipelines	Rubber Tired Dozers	0	8.00	247	0.40
Canal,Turnout,Pipelines	Rubber Tired Loaders	1	8.00	203	0.36
Canal,Turnout,Pipelines	Scrapers	0	8.00	367	0.48
Canal,Turnout,Pipelines	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Canal,Turnout,Pipelines	7	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Canal,Turnout,Pipelines - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0114	0.0000	0.0114	1.2300e-003	0.0000	1.2300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1418	1.4351	1.2542	2.9200e-003		0.0570	0.0570		0.0526	0.0526	0.0000	254.9380	254.9380	0.0816	0.0000	256.9769
Total	**0.1418**	**1.4351**	**1.2542**	**2.9200e-003**	**0.0114**	**0.0570**	**0.0684**	**1.2300e-003**	**0.0526**	**0.0538**	**0.0000**	**254.9380**	**254.9380**	**0.0816**	**0.0000**	**256.9769**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.1300e-003	0.0000	5.1300e-003	5.5000e-004	0.0000	5.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0500	0.9975	1.8179	2.9200e-003		5.9500e-003	5.9500e-003		5.9500e-003	5.9500e-003	0.0000	254.9377	254.9377	0.0816	0.0000	256.9766
Total	**0.0500**	**0.9975**	**1.8179**	**2.9200e-003**	**5.1300e-003**	**5.9500e-003**	**0.0111**	**5.5000e-004**	**5.9500e-003**	**6.5000e-003**	**0.0000**	**254.9377**	**254.9377**	**0.0816**	**0.0000**	**256.9766**

Mitigated Construction Off-Site

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

3.2 Canal,Turnout,Pipelines - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0114	0.0000	0.0114	1.2300e-003	0.0000	1.2300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1970	1.9139	1.8342	4.3000e-003		0.0756	0.0756		0.0697	0.0697	0.0000	375.2581	375.2581	0.1201	0.0000	378.2593
Total	**0.1970**	**1.9139**	**1.8342**	**4.3000e-003**	**0.0114**	**0.0756**	**0.0870**	**1.2300e-003**	**0.0697**	**0.0710**	**0.0000**	**375.2581**	**375.2581**	**0.1201**	**0.0000**	**378.2593**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.1300e-003	0.0000	5.1300e-003	5.5000e-004	0.0000	5.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0735	1.4682	2.6757	4.3000e-003		8.7600e-003	8.7600e-003		8.7600e-003	8.7600e-003	0.0000	375.2576	375.2576	0.1201	0.0000	378.2588
Total	**0.0735**	**1.4682**	**2.6757**	**4.3000e-003**	**5.1300e-003**	**8.7600e-003**	**0.0139**	**5.5000e-004**	**8.7600e-003**	**9.3100e-003**	**0.0000**	**375.2576**	**375.2576**	**0.1201**	**0.0000**	**378.2588**

Mitigated Construction Off-Site

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

3.2 Canal,Turnout,Pipelines - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0114	0.0000	0.0114	1.2300e-003	0.0000	1.2300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1798	1.6482	1.8086	4.2800e-003		0.0648	0.0648		0.0598	0.0598	0.0000	373.8605	373.8605	0.1196	0.0000	376.8505
Total	**0.1798**	**1.6482**	**1.8086**	**4.2800e-003**	**0.0114**	**0.0648**	**0.0762**	**1.2300e-003**	**0.0598**	**0.0610**	**0.0000**	**373.8605**	**373.8605**	**0.1196**	**0.0000**	**376.8505**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.1300e-003	0.0000	5.1300e-003	5.5000e-004	0.0000	5.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0733	1.4626	2.6655	4.2800e-003		8.7300e-003	8.7300e-003		8.7300e-003	8.7300e-003	0.0000	373.8600	373.8600	0.1196	0.0000	376.8500
Total	**0.0733**	**1.4626**	**2.6655**	**4.2800e-003**	**5.1300e-003**	**8.7300e-003**	**0.0139**	**5.5000e-004**	**8.7300e-003**	**9.2800e-003**	**0.0000**	**373.8600**	**373.8600**	**0.1196**	**0.0000**	**376.8500**

Mitigated Construction Off-Site

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

3.2 Canal,Turnout,Pipelines - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0114	0.0000	0.0114	1.2300e-003	0.0000	1.2300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0682	0.6252	0.6860	1.6200e-003		0.0246	0.0246		0.0227	0.0227	0.0000	141.8091	141.8091	0.0454	0.0000	142.9433
Total	**0.0682**	**0.6252**	**0.6860**	**1.6200e-003**	**0.0114**	**0.0246**	**0.0360**	**1.2300e-003**	**0.0227**	**0.0239**	**0.0000**	**141.8091**	**141.8091**	**0.0454**	**0.0000**	**142.9433**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.1300e-003	0.0000	5.1300e-003	5.5000e-004	0.0000	5.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0278	0.5548	1.0111	1.6200e-003		3.3100e-003	3.3100e-003		3.3100e-003	3.3100e-003	0.0000	141.8090	141.8090	0.0454	0.0000	142.9431
Total	**0.0278**	**0.5548**	**1.0111**	**1.6200e-003**	**5.1300e-003**	**3.3100e-003**	**8.4400e-003**	**5.5000e-004**	**3.3100e-003**	**3.8600e-003**	**0.0000**	**141.8090**	**141.8090**	**0.0454**	**0.0000**	**142.9431**

Mitigated Construction Off-Site

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

Conveyance - Pump Station - Kern-San Joaquin County, Annual

Conveyance - Pump Station

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.00	1000sqft	0.07	3,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - construction mobile emissions calculated outside of CalEEMod

Construction Off-road Equipment Mitigation - see construction assumptions

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	100.00	221.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	1.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0908	0.8831	0.8136	1.8700e-003	0.0000	0.0369	0.0369	0.0000	0.0340	0.0340	0.0000	162.8175	162.8175	0.0518	0.0000	164.1115
2024	0.0208	0.1946	0.1952	4.5000e-004	0.0000	8.0300e-003	8.0300e-003	0.0000	7.4100e-003	7.4100e-003	0.0000	39.3380	39.3380	0.0125	0.0000	39.6506
Maximum	**0.0908**	**0.8831**	**0.8136**	**1.8700e-003**	**0.0000**	**0.0369**	**0.0369**	**0.0000**	**0.0340**	**0.0340**	**0.0000**	**162.8175**	**162.8175**	**0.0518**	**0.0000**	**164.1115**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0347	0.6396	1.1562	1.8700e-003	0.0000	4.2400e-003	4.2400e-003	0.0000	4.2400e-003	4.2400e-003	0.0000	162.8173	162.8173	0.0518	0.0000	164.1113
2024	8.3800e-003	0.1545	0.2793	4.5000e-004	0.0000	1.0200e-003	1.0200e-003	0.0000	1.0200e-003	1.0200e-003	0.0000	39.3379	39.3379	0.0125	0.0000	39.6506
Maximum	**0.0347**	**0.6396**	**1.1562**	**1.8700e-003**	**0.0000**	**4.2400e-003**	**4.2400e-003**	**0.0000**	**4.2400e-003**	**4.2400e-003**	**0.0000**	**162.8173**	**162.8173**	**0.0518**	**0.0000**	**164.1113**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**61.45**	**26.32**	**-42.30**	**0.00**	**0.00**	**88.28**	**88.28**	**0.00**	**87.30**	**87.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-26-2023**	**7-25-2023**	0.3557	0.2462
2	**7-26-2023**	**10-25-2023**	0.3596	0.2489
3	**10-26-2023**	**1-25-2024**	0.3513	0.2489
4	**1-26-2024**	**4-25-2024**	0.1217	0.0920
		Highest	0.3596	0.2489

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	4/26/2023	2/28/2024	5	221	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.07

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Cement and Mortar Mixers	1	8.00	9	0.56
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Excavators	1	8.00	158	0.38
Building Construction	Forklifts	0	6.00	89	0.20
Building Construction	Rubber Tired Loaders	1	8.00	203	0.36
Building Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0908	0.8831	0.8136	1.8700e-003		0.0369	0.0369		0.0340	0.0340	0.0000	162.8175	162.8175	0.0518	0.0000	164.1115
Total	**0.0908**	**0.8831**	**0.8136**	**1.8700e-003**		**0.0369**	**0.0369**		**0.0340**	**0.0340**	**0.0000**	**162.8175**	**162.8175**	**0.0518**	**0.0000**	**164.1115**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0347	0.6396	1.1562	1.8700e-003		4.2400e-003	4.2400e-003		4.2400e-003	4.2400e-003	0.0000	162.8173	162.8173	0.0518	0.0000	164.1113
Total	**0.0347**	**0.6396**	**1.1562**	**1.8700e-003**		**4.2400e-003**	**4.2400e-003**		**4.2400e-003**	**4.2400e-003**	**0.0000**	**162.8173**	**162.8173**	**0.0518**	**0.0000**	**164.1113**

Mitigated Construction Off-Site

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

3.2 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0208	0.1946	0.1952	4.5000e-004		8.0300e-003	8.0300e-003		7.4100e-003	7.4100e-003	0.0000	39.3380	39.3380	0.0125	0.0000	39.6506
Total	**0.0208**	**0.1946**	**0.1952**	**4.5000e-004**		**8.0300e-003**	**8.0300e-003**		**7.4100e-003**	**7.4100e-003**	**0.0000**	**39.3380**	**39.3380**	**0.0125**	**0.0000**	**39.6506**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.3800e-003	0.1545	0.2793	4.5000e-004		1.0200e-003	1.0200e-003		1.0200e-003	1.0200e-003	0.0000	39.3379	39.3379	0.0125	0.0000	39.6506
Total	**8.3800e-003**	**0.1545**	**0.2793**	**4.5000e-004**		**1.0200e-003**	**1.0200e-003**		**1.0200e-003**	**1.0200e-003**	**0.0000**	**39.3379**	**39.3379**	**0.0125**	**0.0000**	**39.6506**

Mitigated Construction Off-Site

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

Kern Fan Groundwater - Recharge Facilities and Recovery Wells Construction

Total On-Road Emissions

Kern Fan Groundwater - Recharge Facilities and Recovery Wells

Total On-Road Emissions

260 Max construction days per year

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (pounds/year) ROG	NOX	CO	SO2	PM10 Dust	PM10 Exh	Total PM10	PM2.5 Dust	PM2.5 Exh	Total PM2.5	(MT/yr) Total CO2e
Phase 1																	
Recharge Facilities	Demolition/Site Clearing	2021															
	Hauling	642	65	10	20	15	8.42	167.73	82.75	0.50	11.24	1.77	13.01	3.08	1.69	4.77	25.38
	Vendor	260	65	10	25	15	3.59	63.68	23.96	0.20	6.01	1.07	7.09	1.73	1.03	2.76	10.19
	Worker	650	65	10	16.8	0	0.49	2.04	23.21	0.07	8.30	0.05	8.34	2.20	0.04	2.24	3.46
						Tons/year	0.0062	0.1167	0.065	0.0004	0.0128	0.0014	0.0142	0.0035	0.0014	0.0049	39.03
	Pipelines	2021															
	Hauling	30	65	10	4	15	0.28	4.10	3.40	0.01	0.11	0.02	0.13	0.03	0.02	0.05	0.47
	Vendor	130	65	10	25	15	1.79	31.84	11.98	0.10	3.01	0.54	3.54	0.86	0.51	1.38	5.10
	Worker	650	65	10	16.8	0	0.49	2.04	23.21	0.07	8.30	0.05	8.34	2.20	0.04	2.24	3.46
						Tons/year	0.0013	0.019	0.0193	9E-05	0.0057	0.0003	0.006	0.0015	0.0003	0.0018	9.03
	Basins-2021	2021															
	Hauling	22,743	131	10	4	15	212.44	3106.05	2580.05	7.07	79.66	15.39	95.05	21.84	14.72	36.57	355.18
	Vendor	524	131	10	25	15	7.24	128.35	48.29	0.41	12.12	2.16	14.29	3.49	2.07	5.56	20.54
	Worker	2620	131	10	16.8	0	1.97	8.22	93.55	0.30	33.44	0.19	33.63	8.86	0.17	9.04	13.96
						Tons/year	0.1108	1.6213	1.3609	0.0039	0.0626	0.0089	0.0715	0.0171	0.0085	0.0256	389.68
	Basins-2022	2022															
	Hauling	8,950	85	10	4	15	78.56	1177.46	1055.31	2.78	31.35	3.17	34.52	8.60	3.03	11.63	139.50
	Vendor	340	85	10	25	15	3.08	69.26	28.10	0.26	7.86	0.73	8.60	2.26	0.70	2.96	13.03
	Worker	1700	85	10	16.8	0	1.09	4.59	54.51	0.19	21.70	0.11	21.81	5.75	0.10	5.86	8.81
						Tons/year	0.0414	0.6257	0.569	0.0016	0.0305	0.002	0.0325	0.0083	0.0019	0.0102	161.34
	Restoration	2022															
	Hauling	0	21	10	4	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	84	21	10	25	15	0.76	17.11	6.94	0.06	1.94	0.18	2.12	0.56	0.17	0.73	3.22
	Worker	126	21	10	16.8	0	0.08	0.34	4.04	0.01	1.61	0.01	1.62	0.43	0.01	0.43	0.65
						Tons/year	0.0004	0.0087	0.0055	4E-05	0.0018	9E-05	0.0019	0.0005	9E-05	0.0006	3.87
Recovery Wells	Well Drilling	2022															
	Hauling	8	44	10	4	15	0.07	1.05	0.94	0.00	0.03	0.00	0.03	0.01	0.00	0.01	0.12
	Vendor	176	44	10	25	15	1.59	35.85	14.55	0.13	4.07	0.38	4.45	1.17	0.36	1.53	6.75
	Worker	440	44	10	16.8	0	0.28	1.19	14.11	0.05	5.62	0.03	5.65	1.49	0.03	1.52	2.28
						Tons/year	0.001	0.019	0.0148	9E-05	0.0049	0.0002	0.0051	0.0013	0.0002	0.0015	9.15
	Well Construction	2023															
	Hauling	0	50	10	4	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	202	50	10	25	15	1.08	32.61	15.45	0.15	4.67	0.20	4.87	1.34	0.19	1.53	7.45
	Worker	500	50	10	16.8	0	0.27	1.17	14.52	0.05	6.38	0.03	6.41	1.69	0.03	1.72	2.52
						Tons/year	0.0007	0.0169	0.015	0.0001	0.0055	0.0001	0.0056	0.0015	0.0001	0.0016	9.97
	Pipelines	2023															
		0															
	Hauling	122	65	10	4	15	1.03	14.51	15.04	0.04	0.43	0.03	0.46	0.12	0.03	0.15	1.83
	Vendor	260	65	10	25	15	1.39	41.97	19.88	0.19	6.01	0.26	6.27	1.73	0.24	1.97	9.59
	Worker	650	65	10	16.8	0	0.36	1.52	18.87	0.07	8.30	0.04	8.34	2.20	0.04	2.24	3.28
						Tons/year	0.0014	0.029	0.0269	0.0001	0.0074	0.0002	0.0075	0.002	0.0002	0.0022	14.70

Kern Fan Groundwater - Recharge Facilities and Recovery Wells Construction

Total On-Road Emissions

Kern Fan Groundwater - Recharge Facilities and Recovery Wells

Total On-Road Emissions

260 Max construction days per year

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (pounds/year) ROG	NOX	CO	SO2	PM10 Dust	PM10 Exh	Total PM10	PM2.5 Dust	PM2.5 Exh	Total PM2.5	(MT/yr) Total CO2e
Phase 2																	
Recharge Facilities	Demolition/Site Clearing	2022															
	Hauling	642	67	10	4	15	5.64	84.46	75.70	0.20	2.25	0.23	2.48	0.62	0.22	0.83	10.01
	Vendor	368	67	10	25	15	3.33	74.96	30.41	0.28	8.51	0.79	9.30	2.45	0.76	3.21	14.11
	Worker	670	67	10	16.8	0	0.43	1.81	21.48	0.07	8.55	0.04	8.60	2.27	0.04	2.31	3.47
						Tons/year	0.0047	0.0806	0.0638	0.0003	0.0097	0.0005	0.0102	0.0027	0.0005	0.0032	27.59
	Pipelines	2022															
		0															
	Hauling	30	67	10	4	15	0.26	3.95	3.54	0.01	0.11	0.01	0.12	0.03	0.01	0.04	0.47
	Vendor	368	67	10	25	15	3.33	74.96	30.41	0.28	8.51	0.79	9.30	2.45	0.76	3.21	14.11
	Worker	670	67	10	16.8	0	0.43	1.81	21.48	0.07	8.55	0.04	8.60	2.27	0.04	2.31	3.47
						Tons/year	0.002	0.0404	0.0277	0.0002	0.0086	0.0004	0.009	0.0024	0.0004	0.0028	18.05
	Basins	2022															
		0															
	Hauling	37,500	220	10	4	15	329.17	4933.48	4421.69	11.63	131.35	13.28	144.63	36.02	12.71	48.72	584.48
	Vendor	1224	220	10	25	15	11.09	249.34	101.16	0.94	28.31	2.63	30.95	8.14	2.52	10.66	46.92
	Worker	4400	220	10	16.8	0	2.83	11.87	141.09	0.49	56.16	0.29	56.45	14.89	0.27	15.16	22.80
						Tons/year	0.1715	2.5973	2.332	0.0065	0.1079	0.0081	0.116	0.0295	0.0077	0.0373	654.21
	Restoration	2022															
		0															
	Hauling	0	22	10	4	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	120	22	10	25	15	1.09	24.44	9.92	0.09	2.78	0.26	3.03	0.80	0.25	1.05	4.60
	Worker	132	22	10	16.8	0	0.08	0.36	4.23	0.01	1.68	0.01	1.69	0.45	0.01	0.45	0.68
						Tons/year	0.0006	0.0124	0.0071	5E-05	0.0022	0.0001	0.0024	0.0006	0.0001	0.0007	5.28
Recovery Wells	Well Drilling	2023															
		0															
	Hauling	8	42	10	4	15	0.07	0.95	0.99	0.00	0.03	0.00	0.03	0.01	0.00	0.01	0.12
	Vendor	168	42	10	25	15	0.90	27.12	12.85	0.12	3.89	0.17	4.05	1.12	0.16	1.28	6.20
	Worker	420	42	10	16.8	0	0.23	0.98	12.19	0.05	5.36	0.03	5.39	1.42	0.02	1.45	2.12
						Tons/year	0.0006	0.0145	0.013	9E-05	0.0046	1E-04	0.0047	0.0013	9E-05	0.0014	8.43
	Well Construction-2023	2023															
		0															
	Hauling	0	20	10	4	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	82	20	10	25	15	0.44	13.24	6.27	0.06	1.90	0.08	1.98	0.55	0.08	0.62	3.02
	Worker	200	20	10	16.8	0	0.11	0.47	5.81	0.02	2.55	0.01	2.57	0.68	0.01	0.69	1.01
						Tons/year	0.0003	0.0069	0.006	4E-05	0.0022	5E-05	0.0023	0.0006	4E-05	0.0007	4.03
	Well Construction-2024	2024															
		0															
	Hauling	0	30	10	4	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	120	30	10	25	15	0.63	19.38	9.06	0.09	2.78	0.12	2.90	0.80	0.11	0.91	4.36
	Worker	300	30	10	16.8	0	0.14	0.61	8.00	0.03	3.83	0.02	3.85	1.02	0.02	1.03	1.48
						Tons/year	0.0004	0.01	0.0085	6E-05	0.0033	7E-05	0.0034	0.0009	7E-05	0.001	5.83
	Pipelines-2023	2023															
		0															
	Hauling	0	20	10	4	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	80	20	10	25	15	0.43	12.91	6.12	0.06	1.85	0.08	1.93	0.53	0.08	0.61	2.95
	Worker	200	20	10	16.8	0	0.11	0.47	5.81	0.02	2.55	0.01	2.57	0.68	0.01	0.69	1.01
						Tons/year	0.0003	0.0067	0.006	4E-05	0.0022	5E-05	0.0022	0.0006	4E-05	0.0006	3.96
	Pipelines-2024	2024															
	Hauling	0	43	10	4	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	172	43	10	25	15	0.91	27.78	12.99	0.12	3.98	0.17	4.15	1.14	0.16	1.31	6.24
	Worker	430	43	10	16.8	0	0.20	0.87	11.46	0.04	5.49	0.03	5.51	1.45	0.02	1.48	2.12
						Tons/year	0.0006	0.0143	0.0122	8E-05	0.0047	1E-04	0.0048	0.0013	9E-05	0.0014	8.36

Kern Fan Groundwater - Recharge Facilities and Recovery Wells Construction
Running Emissions

		Running Emissions Factor (grams/mile)						Running Emissions Factor (grams/mile)		
		ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2021	Hauling	0.10696086	3.534903329	0.43803629	0.01348928	0.05882401	0.05627931	1429.29628	0.00777247	0.22472164
2021	Vendor	0.17184375	3.399914463	0.63393245	0.01239341	0.07321182	0.07004226	1308.41359	0.01014741	0.19334544
2021	Worker	0.0203387	0.084722974	0.96407181	0.00310873	0.0019162	0.00176455	314.892214	0.00479042	0.00720626
2022	Hauling	0.05933716	2.989992345	0.29498919	0.01311703	0.03459656	0.03309993	1389.8695	0.00540484	0.21852274
2022	Vendor	0.08728332	2.667682914	0.40947458	0.01205833	0.03841758	0.03675328	1272.99738	0.0060091	0.1878071
2022	Worker	0.01733768	0.072850581	0.86577548	0.00301225	0.00179691	0.00165456	306.464267	0.00414701	0.00650031
2023	Hauling	0.02198962	2.363271751	0.21367131	0.01256686	0.0269086	0.02574454	1331.61178	0.00352949	0.20936386
2023	Vendor	0.02026207	1.984551578	0.2405087	0.01159916	0.01746971	0.01671165	1224.43577	0.00271829	0.18019917
2023	Worker	0.01481303	0.062981334	0.78380387	0.00291567	0.00169095	0.00155684	298.534417	0.00360237	0.00590441
2024	Hauling	0.02200281	2.362231096	0.21554256	0.01234083	0.02713796	0.02596398	1307.659	0.00340126	0.20559713
2024	Vendor	0.01968046	1.993048637	0.22899882	0.01142225	0.01764369	0.01687812	1205.77103	0.00254427	0.17739062
2024	Worker	0.012774	0.054929894	0.71985943	0.00282046	0.00160389	0.0014765	291.229262	0.00315696	0.00540934
GWP		N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/year) ROG	NOX	CO	SO2	PM10	PM2.5	Regional Emissions (MT/year) CO2	CH4	N2O	CO2e
Phase 1															
Recharge Facilities	Demolition/Site Clearing	2021													
	Hauling	642	65	10	20	3.03	100.06	12.40	0.38	1.67	1.59	18.35	0.00	0.84	19.19
	Vendor	260	65	10	25	2.46	48.72	9.08	0.18	1.05	1.00	8.50	0.00	0.36	8.87
	Worker	650	65	10	16.8	0.49	2.04	23.21	0.07	0.05	0.04	3.44	0.00	0.02	3.46
	Pipelines	2021													
	Hauling	30	65	10	4	0.03	0.94	0.12	0.00	0.02	0.01	0.17	0.00	0.01	0.18
	Vendor	130	65	10	25	1.23	24.36	4.54	0.09	0.52	0.50	4.25	0.00	0.18	4.44
	Worker	650	65	10	16.8	0.49	2.04	23.21	0.07	0.05	0.04	3.44	0.00	0.02	3.46
	Basins-2021	2021													
	Hauling	22743	131	10	4	21.45	708.96	87.85	2.71	11.80	11.29	130.03	0.02	5.93	135.97
	Vendor	524	131	10	25	4.96	98.19	18.31	0.36	2.11	2.02	17.14	0.00	0.73	17.88
	Worker	2620	131	10	16.8	1.97	8.22	93.55	0.30	0.19	0.17	13.86	0.01	0.09	13.96
	Basins-2022	2022													
	Hauling	8950	85	10	4	4.68	235.99	23.28	1.04	2.73	2.61	49.76	0.00	2.27	52.03
	Vendor	340	85	10	25	1.64	49.99	7.67	0.23	0.72	0.69	10.82	0.00	0.46	11.28
	Worker	1700	85	10	16.8	1.09	4.59	54.51	0.19	0.11	0.10	8.75	0.00	0.05	8.81
	Restoration	2022													
	Hauling	0	21	10	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	84	21	10	25	0.40	12.35	1.90	0.06	0.18	0.17	2.67	0.00	0.11	2.79
	Worker	126	21	10	16.8	0.08	0.34	4.04	0.01	0.01	0.01	0.65	0.00	0.00	0.65
Recovery Wells	Well Drilling	2022													
	Hauling	8	44	10	4	0.00	0.21	0.02	0.00	0.00	0.00	0.04	0.00	0.00	0.05
	Vendor	176	44	10	25	0.85	25.88	3.97	0.12	0.37	0.36	5.60	0.00	0.24	5.84
	Worker	440	44	10	16.8	0.28	1.19	14.11	0.05	0.03	0.03	2.27	0.00	0.01	2.28
	Well Construction	2023													
	Hauling	0	50	10	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	202	50	10	25	0.23	22.09	2.68	0.13	0.19	0.19	6.18	0.00	0.26	6.45
	Worker	500	50	10	16.8	0.27	1.17	14.52	0.05	0.03	0.03	2.51	0.00	0.01	2.52
	Pipelines	2023													
	Hauling	122	65	10	4	0.02	2.54	0.23	0.01	0.03	0.03	0.65	0.00	0.03	0.68
	Vendor	260	65	10	25	0.29	28.44	3.45	0.17	0.25	0.24	7.96	0.00	0.34	8.30
	Worker	650	65	10	16.8	0.36	1.52	18.87	0.07	0.04	0.04	3.26	0.00	0.02	3.28

Kern Fan Groundwater - Recharge Facilities and Recovery Wells Construction
Running Emissions

		Running Emissions Factor (grams/mile)						Running Emissions Factor (grams/mile)		
	ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2021Hauling	Hauling	0.10696086	3.534903329	0.43803629	0.01348928	0.05882401	0.05627931	1429.29628	0.00777247	0.22472164
2021Vendor	Vendor	0.17184375	3.399914463	0.63393245	0.01239341	0.07321182	0.07004226	1308.41359	0.01014741	0.19334544
2021Worker	Worker	0.0203387	0.084722974	0.96407181	0.00310873	0.0019162	0.00176455	314.892214	0.00479042	0.00720626
2022Hauling	Hauling	0.05933716	2.989992345	0.29498919	0.01311703	0.03459656	0.03309993	1389.8695	0.00540484	0.21852274
2022Vendor	Vendor	0.08728332	2.667682914	0.40947458	0.01205833	0.03841758	0.03675328	1272.99738	0.0060091	0.1878071
2022Worker	Worker	0.01733768	0.072850581	0.86577548	0.00301225	0.00179691	0.00165456	306.464267	0.00414701	0.00650031
2023Hauling	Hauling	0.02198962	2.363271751	0.21367131	0.01256686	0.0269086	0.02574454	1331.61178	0.00352949	0.20936386
2023Vendor	Vendor	0.02026207	1.984551578	0.2405087	0.01159916	0.01746971	0.01671165	1224.43577	0.00271829	0.18019917
2023Worker	Worker	0.01481303	0.062981334	0.78380387	0.00291567	0.00169095	0.00155684	298.534417	0.00360237	0.00590441
2024Hauling	Hauling	0.02200281	2.362231096	0.21554256	0.01234083	0.02713796	0.02596398	1307.659	0.00340126	0.20559713
2024Vendor	Vendor	0.01968046	1.993048637	0.22899882	0.01142225	0.01764369	0.01687812	1205.77103	0.00254427	0.17739062
2024Worker	Worker	0.012774	0.054929894	0.71985943	0.00282046	0.00160389	0.0014765	291.229262	0.00315696	0.00540934
GWP		N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/year)						Regional Emissions (MT/year)			
						ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Phase 2															
Recharge Facilities	Demolition/Site Clearing	2022													
	Hauling	642	67	10	4	0.34	16.93	1.67	0.07	0.20	0.19	3.57	0.00	0.16	3.73
	Vendor	368	67	10	25	1.77	54.11	8.31	0.24	0.78	0.75	11.71	0.00	0.50	12.21
	Worker	670	67	10	16.8	0.43	1.81	21.48	0.07	0.04	0.04	3.45	0.00	0.02	3.47
	Pipelines	2022													
	Hauling	30	67	10	4	0.02	0.79	0.08	0.00	0.01	0.01	0.17	0.00	0.01	0.17
	Vendor	368	67	10	25	1.77	54.11	8.31	0.24	0.78	0.75	11.71	0.00	0.50	12.21
	Worker	670	67	10	16.8	0.43	1.81	21.48	0.07	0.04	0.04	3.45	0.00	0.02	3.47
	Basins	2022													
	Hauling	37500	220	10	4	19.62	988.77	97.55	4.34	11.44	10.95	208.48	0.02	9.51	218.01
	Vendor	1224	220	10	25	5.89	179.97	27.62	0.81	2.59	2.48	38.95	0.00	1.67	40.62
	Worker	4400	220	10	16.8	2.83	11.87	141.09	0.49	0.29	0.27	22.65	0.01	0.14	22.80
	Restoration	2022													
	Hauling	0	22	10	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	120	22	10	25	0.58	17.64	2.71	0.08	0.25	0.24	3.82	0.00	0.16	3.98
	Worker	132	22	10	16.8	0.08	0.36	4.23	0.01	0.01	0.01	0.68	0.00	0.00	0.68
Recovery Wells	Well Drilling	2023													
	Hauling	8	42	10	4	0.00	0.17	0.02	0.00	0.00	0.00	0.04	0.00	0.00	0.04
	Vendor	168	42	10	25	0.19	18.38	2.23	0.11	0.16	0.15	5.14	0.00	0.22	5.36
	Worker	420	42	10	16.8	0.23	0.98	12.19	0.05	0.03	0.02	2.11	0.00	0.01	2.12
	Well Construction-2023	2023													
	Hauling	0	20	10	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	82	20	10	25	0.09	8.97	1.09	0.05	0.08	0.08	2.51	0.00	0.11	2.62
	Worker	200	20	10	16.8	0.11	0.47	5.81	0.02	0.01	0.01	1.00	0.00	0.01	1.01
	Well Construction-2024	2024													
	Hauling	0	30	10	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	120	30	10	25	0.13	13.18	1.51	0.08	0.12	0.11	3.62	0.00	0.15	3.77
	Worker	300	30	10	16.8	0.14	0.61	8.00	0.03	0.02	0.02	1.47	0.00	0.01	1.48
	Pipelines-2023	2023													
	Hauling	0	20	10	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	80	20	10	25	0.09	8.75	1.06	0.05	0.08	0.07	2.45	0.00	0.10	2.55
	Worker	200	20	10	16.8	0.11	0.47	5.81	0.02	0.01	0.01	1.00	0.00	0.01	1.01
	Pipelines-2024	2024													
	Hauling	0	43	10	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	172	43	10	25	0.19	18.89	2.17	0.11	0.17	0.16	5.18	0.00	0.22	5.41
	Worker	430	43	10	16.8	0.20	0.87	11.46	0.04	0.03	0.02	2.10	0.00	0.01	2.12

Kern Fan Groundwater - Recharge Facilities and Recovery Wells Construction
Idling Emissions

		Idling Emissions Factor (grams/minute)						Idling Emissions Factor (grams/minute)		
		ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2021Hauling	Hauling	0.25394012	3.1872147	3.31366486	0.00580066	0.00477227	0.00456582	614.27015	0.01191359	0.09656787
2021Vendor	Vendor	0.13113069	1.740355284	1.73020195	0.00305824	0.00288895	0.00276398	323.799494	0.00656608	0.05075199
2021Worker	Worker	0	0	0	0	0	0	0	0	0
2022Hauling	Hauling	0.24961514	3.180958636	3.48692535	0.00588157	0.00148277	0.00141863	622.828215	0.01170744	0.09791278
2022Vendor	Vendor	0.12855133	1.713823628	1.81678197	0.00309624	0.00104451	0.00099933	327.818632	0.00645225	0.05138502
2022Worker	Worker	0	0	0	0	0	0	0	0	0
2023Hauling	Hauling	0.24881098	2.966139031	3.67141608	0.00566727	0.00113581	0.00108668	600.141499	0.01166629	0.09434656
2023Vendor	Vendor	0.12770334	1.573650273	1.91148519	0.00298408	0.00065322	0.00062497	315.944859	0.00642698	0.04951708
2023Worker	Worker	0	0	0	0	0	0	0	0	0
2024Hauling	Hauling	0.2474886	2.947744283	3.65262255	0.00556258	0.00111983	0.00107139	589.049555	0.01159906	0.09260258
2024Vendor	Vendor	0.12696582	1.56188622	1.9017452	0.00292987	0.00063348	0.00060608	310.203523	0.00638239	0.04862085
2024Worker	Worker	0	0	0	0	0	0	0	0	0
	GWP	N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	Idling minutes per Day (miles)	Regional Emissions (pounds/year) ROG	NOX	CO	SO2	PM10	PM2.5	Regional Emissions (MT/year) CO2	CH4	N2O	CO2e
Phase 1															
Recharge Facilities	Demolition/Site Clearing	2021													
	Hauling	642	65	10	15	5.39	67.67	70.35	0.12	0.10	0.10	5.92	0.00	0.27	6.19
	Vendor	260	65	10	15	1.13	14.96	14.88	0.03	0.02	0.02	1.26	0.00	0.06	1.32
	Worker	650	65	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipelines	2021													
	Hauling	30	65	10	15	0.25	3.16	3.29	0.01	0.00	0.00	0.28	0.00	0.01	0.29
	Vendor	130	65	10	15	0.56	7.48	7.44	0.01	0.01	0.01	0.63	0.00	0.03	0.66
	Worker	650	65	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Basins-2021	2021													
	Hauling	22743	131	10	15	190.99	2397.09	2492.19	4.36	3.59	3.43	209.56	0.10	9.55	219.21
	Vendor	524	131	10	15	2.27	30.16	29.98	0.05	0.05	0.05	2.55	0.00	0.12	2.66
	Worker	2620	131	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Basins-2022	2022													
	Hauling	8950	85	10	15	73.88	941.47	1032.03	1.74	0.44	0.42	83.61	0.04	3.81	87.47
	Vendor	340	85	10	15	1.45	19.27	20.43	0.03	0.01	0.01	1.67	0.00	0.08	1.75
	Worker	1700	85	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Restoration	2022													
	Hauling	0	21	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	84	21	10	15	0.36	4.76	5.05	0.01	0.00	0.00	0.41	0.00	0.02	0.43
	Worker	126	21	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovery Wells	Well Drilling	2022													
	Hauling	8	44	10	15	0.07	0.84	0.92	0.00	0.00	0.00	0.07	0.00	0.00	0.08
	Vendor	176	44	10	15	0.75	9.97	10.57	0.02	0.01	0.01	0.87	0.00	0.04	0.91
	Worker	440	44	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Well Construction	2023													
	Hauling	0	50	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	202	50	10	15	0.85	10.51	12.77	0.02	0.00	0.00	0.96	0.00	0.04	1.00
	Worker	500	50	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipelines	2023													
	Hauling	122	65	10	15	1.00	11.97	14.81	0.02	0.00	0.00	1.10	0.00	0.05	1.15
	Vendor	260	65	10	15	1.10	13.53	16.44	0.03	0.01	0.01	1.23	0.00	0.06	1.29
	Worker	650	65	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Kern Fan Groundwater - Recharge Facilities and Recovery Wells Construction
Idling Emissions

		Idling Emissions Factor (grams/minute)						Idling Emissions Factor (grams/minute)		
		ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2021Hauling	Hauling	0.25394012	3.1872147	3.31366486	0.00580066	0.00477227	0.00456582	614.27015	0.01191359	0.09656787
2021Vendor	Vendor	0.13113069	1.740355284	1.73020195	0.00305824	0.00288895	0.00276398	323.799494	0.00656608	0.05075199
2021Worker	Worker	0	0	0	0	0	0	0	0	0
2022Hauling	Hauling	0.24961514	3.180958636	3.48692535	0.00588157	0.00148277	0.00141863	622.828215	0.01170744	0.09791278
2022Vendor	Vendor	0.12855133	1.713823628	1.81678197	0.00309624	0.00104451	0.00099933	327.818632	0.00645225	0.05138502
2022Worker	Worker	0	0	0	0	0	0	0	0	0
2023Hauling	Hauling	0.24881098	2.966139031	3.67141608	0.00566727	0.00113581	0.00108668	600.141499	0.01166629	0.09434656
2023Vendor	Vendor	0.12770334	1.573650273	1.91148519	0.00298408	0.00065322	0.00062497	315.944859	0.00642698	0.04951708
2023Worker	Worker	0	0	0	0	0	0	0	0	0
2024Hauling	Hauling	0.2474886	2.947744283	3.65262255	0.00556258	0.00111983	0.00107139	589.049555	0.01159906	0.09260258
2024Vendor	Vendor	0.12696582	1.56188622	1.9017452	0.00292987	0.00063348	0.00060608	310.203523	0.00638239	0.04862085
2024Worker	Worker	0	0	0	0	0	0	0	0	0
	GWP	N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	Idling minutes per Day (miles)	Regional Emissions (pounds/year) ROG	NOX	CO	SO2	PM10	PM2.5	Regional Emissions (MT/year) CO2	CH4	N2O	CO2e
Phase 2															
Recharge Facilities	Demolition/Site Clearing	2022													
	Hauling	642	67	10	15	5.30	67.53	74.03	0.12	0.03	0.03	6.00	0.00	0.27	6.27
	Vendor	368	67	10	15	1.56	20.86	22.11	0.04	0.01	0.01	1.81	0.00	0.08	1.89
	Worker	670	67	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipelines	2022													
	Hauling	30	67	10	15	0.25	3.16	3.46	0.01	0.00	0.00	0.28	0.00	0.01	0.29
	Vendor	368	67	10	15	1.56	20.86	22.11	0.04	0.01	0.01	1.81	0.00	0.08	1.89
	Worker	670	67	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Basins	2022													
	Hauling	37500	220	10	15	309.55	3944.71	4324.14	7.29	1.84	1.76	350.34	0.16	15.97	366.48
	Vendor	1224	220	10	15	5.20	69.37	73.54	0.13	0.04	0.04	6.02	0.00	0.27	6.30
	Worker	4400	220	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Restoration	2022													
	Hauling	0	22	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	120	22	10	15	0.51	6.80	7.21	0.01	0.00	0.00	0.59	0.00	0.03	0.62
	Worker	132	22	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovery Wells	Well Drilling	2023													
	Hauling	8	42	10	15	0.07	0.78	0.97	0.00	0.00	0.00	0.07	0.00	0.00	0.08
	Vendor	168	42	10	15	0.71	8.74	10.62	0.02	0.00	0.00	0.80	0.00	0.04	0.83
	Worker	420	42	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Well Construction-2023	2023													
	Hauling	0	20	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	82	20	10	15	0.35	4.27	5.18	0.01	0.00	0.00	0.39	0.00	0.02	0.41
	Worker	200	20	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Well Construction-2024	2024													
	Hauling	0	30	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	120	30	10	15	0.50	6.20	7.55	0.01	0.00	0.00	0.56	0.00	0.03	0.58
	Worker	300	30	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipelines-2023	2023													
	Hauling	0	20	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	80	20	10	15	0.34	4.16	5.06	0.01	0.00	0.00	0.38	0.00	0.02	0.40
	Worker	200	20	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pipelines-2024	2024													
	Hauling	0	43	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	172	43	10	15	0.72	8.88	10.82	0.02	0.00	0.00	0.80	0.00	0.04	0.84
	Worker	430	43	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Kern Fan Groundwater - Recharge Facilities and Recovery Wells Construction
Road Dust, Break Wear, and Tire wear Emissions

	Emission Factors (grams/mile)					
	PM10			PM2.5		
	RD	BW	TW	RD	BW	TW
2021Hauling Hauling	3.00E-01	0.061489012	0.03585244	7.36E-02	0.02635243	0.00896311
2021Vendor Vendor	3.00E-01	0.095914524	0.02392622	7.36E-02	0.04110622	0.00598155
2021Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2022Hauling Hauling	3.00E-01	0.06149938	0.03585844	7.36E-02	0.02635688	0.00896461
2022Vendor Vendor	3.00E-01	0.095919709	0.02392922	7.36E-02	0.04110845	0.00598231
2022Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2023Hauling Hauling	3.00E-01	0.061509934	0.03586453	7.36E-02	0.0263614	0.00896613
2023Vendor Vendor	3.00E-01	0.095924986	0.02393227	7.36E-02	0.04111071	0.00598307
2023Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2024Hauling Hauling	3.00E-01	0.061520383	0.03587055	7.36E-02	0.02636588	0.00896764
2024Vendor Vendor	3.00E-01	0.09593021	0.02393527	7.36E-02	0.04111295	0.00598382
2024Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002

	Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/year) PM10 RD	PM10 BW	PM10 TW	PM2.5 RD	PM2.5 BW	PM2.5 TW
Phase 1											
Recharge Facilities	Demolition/Site Clearing	2021									
	Hauling	642	65	10	20	8.49	1.74	1.01	2.08	0.75	0.25
	Vendor	260	65	10	25	4.30	1.37	0.34	1.05	0.59	0.09
	Worker	650	65	10	16.8	7.22	0.88	0.19	1.77	0.38	0.05
	Pipelines	2021									
	Hauling	30	65	10	4	0.08	0.02	0.01	0.02	0.01	0.00
	Vendor	130	65	10	25	2.15	0.69	0.17	0.53	0.29	0.04
	Worker	650	65	10	16.8	7.22	0.88	0.19	1.77	0.38	0.05
	Basins-2021	2021									
	Hauling	22743	131	10	4	60.14	12.33	7.19	14.76	5.29	1.80
	Vendor	524	131	10	25	8.66	2.77	0.69	2.13	1.19	0.17
	Worker	2620	131	10	16.8	29.10	3.57	0.78	7.14	1.53	0.19
	Basins-2022	2022									
	Hauling	8950	85	10	4	23.67	4.85	2.83	5.81	2.08	0.71
	Vendor	340	85	10	25	5.62	1.80	0.45	1.38	0.77	0.11
	Worker	1700	85	10	16.8	18.88	2.31	0.50	4.63	0.99	0.13
	Restoration	2022									
	Hauling	0	21	10	4	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	84	21	10	25	1.39	0.44	0.11	0.34	0.19	0.03
	Worker	126	21	10	16.8	1.40	0.17	0.04	0.34	0.07	0.01
Recovery Wells	Well Drilling	2022									
	Hauling	8	44	10	4	0.02	0.00	0.00	0.01	0.00	0.00
	Vendor	176	44	10	25	2.91	0.93	0.23	0.71	0.40	0.06
	Worker	440	44	10	16.8	4.89	0.60	0.13	1.20	0.26	0.03
	Well Construction	2023									
	Hauling	0	50	10	4	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	202	50	10	25	3.34	1.07	0.27	0.82	0.46	0.07
	Worker	500	50	10	16.8	5.55	0.68	0.15	1.36	0.29	0.04
	Pipelines	2023									
	Hauling	122	65	10	4	0.32	0.07	0.04	0.08	0.03	0.01
	Vendor	260	65	10	25	4.30	1.37	0.34	1.05	0.59	0.09
	Worker	650	65	10	16.8	7.22	0.88	0.19	1.77	0.38	0.05

Kern Fan Groundwater - Recharge Facilities and Recovery Wells Construction
Road Dust, Break Wear, and Tire wear Emissions

	Emission Factors (grams/mile)					
	PM10			PM2.5		
	RD	BW	TW	RD	BW	TW
2021Hauling Hauling	3.00E-01	0.061489012	0.03585244	7.36E-02	0.02635243	0.00896311
2021Vendor Vendor	3.00E-01	0.095914524	0.02392622	7.36E-02	0.04110622	0.00598155
2021Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2022Hauling Hauling	3.00E-01	0.06149938	0.03585844	7.36E-02	0.02635688	0.00896461
2022Vendor Vendor	3.00E-01	0.095919709	0.02392922	7.36E-02	0.04110845	0.00598231
2022Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2023Hauling Hauling	3.00E-01	0.061509934	0.03586453	7.36E-02	0.0263614	0.00896613
2023Vendor Vendor	3.00E-01	0.095924986	0.02393227	7.36E-02	0.04111071	0.00598307
2023Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2024Hauling Hauling	3.00E-01	0.061520383	0.03587055	7.36E-02	0.02636588	0.00896764
2024Vendor Vendor	3.00E-01	0.09593021	0.02393527	7.36E-02	0.04111295	0.00598382
2024Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002

	Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/year) PM10 RD	PM10 BW	PM10 TW	PM2.5 RD	PM2.5 BW	PM2.5 TW
Phase 2											
Recharge Facilities	Demolition/Site Clearing	2022									
	Hauling	642	67	10	4	1.70	0.35	0.20	0.42	0.15	0.05
	Vendor	368	67	10	25	6.08	1.95	0.49	1.49	0.83	0.12
	Worker	670	67	10	16.8	7.44	0.91	0.20	1.83	0.39	0.05
	Pipelines	2022									
	Hauling	30	67	10	4	0.08	0.02	0.01	0.02	0.01	0.00
	Vendor	368	67	10	25	6.08	1.95	0.49	1.49	0.83	0.12
	Worker	670	67	10	16.8	7.44	0.91	0.20	1.83	0.39	0.05
	Basins	2022									
	Hauling	37500	220	10	4	99.16	20.34	11.86	24.34	8.72	2.96
	Vendor	1224	220	10	25	20.23	6.47	1.61	4.97	2.77	0.40
	Worker	4400	220	10	16.8	48.87	5.99	1.30	11.99	2.57	0.33
	Restoration	2022									
	Hauling	0	22	10	4	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	120	22	10	25	1.98	0.63	0.16	0.49	0.27	0.04
	Worker	132	22	10	16.8	1.47	0.18	0.04	0.36	0.08	0.01
Recovery Wells	Well Drilling	2023									
	Hauling	8	42	10	4	0.02	0.00	0.00	0.01	0.00	0.00
	Vendor	168	42	10	25	2.78	0.89	0.22	0.68	0.38	0.06
	Worker	420	42	10	16.8	4.66	0.57	0.12	1.14	0.25	0.03
	Well Construction-2023	2023									
	Hauling	0	20	10	4	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	82	20	10	25	1.36	0.43	0.11	0.33	0.19	0.03
	Worker	200	20	10	16.8	2.22	0.27	0.06	0.55	0.12	0.01
	Well Construction-2024	2024									
	Hauling	0	30	10	4	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	120	30	10	25	1.98	0.63	0.16	0.49	0.27	0.04
	Worker	300	30	10	16.8	3.33	0.41	0.09	0.82	0.18	0.02
	Pipelines-2023	2023									
	Hauling	0	20	10	4	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	80	20	10	25	1.32	0.42	0.11	0.32	0.18	0.03
	Worker	200	20	10	16.8	2.22	0.27	0.06	0.55	0.12	0.01
	Pipelines-2024	2024									
	Hauling	0	43	10	4	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	172	43	10	25	2.84	0.91	0.23	0.70	0.39	0.06
	Worker	430	43	10	16.8	4.78	0.59	0.13	1.17	0.25	0.03

Kern Fan Groundwater Project - Conveyance Facilities Construction

Total On-Road Emissions

Kern Fan Groundwater Project - Conveyance Facilities Construction

Total On-Road Emissions

260 Max construction days per year

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (pounds/year) ROG	NOX	CO	SO2	PM10 Dust	PM10 Exh	Total PM10	PM2.5 Dust	PM2.5 Exh	Total PM2.5	(MT/yr) Total CO2e
Conveyance Facilities	Turnout, Pipelines, Canal-2023	2023															
	Hauling	16,967	178	10	3.3	15	142.32	1955.98	2086.36	4.73	49.03	3.96	52.99	13.45	3.79	17.23	237.74
	Vendor	1,717	178	10	25	15	9.17	277.16	131.29	1.27	39.72	1.69	41.41	11.42	1.62	13.04	63.32
	Worker	3560	178	10	16.8	0	1.95	8.30	103.35	0.38	45.44	0.22	45.66	12.04	0.21	12.25	17.96
						Tons/year	0.07672	1.12072	1.1605	0.00319	0.06709	0.00294	0.07003	0.01846	0.0028	0.02126	319.02
	Turnout, Pipelines, Canal-2024	2024															
	Hauling	24,973	262	10	3.3	15	208.38	2863.55	3055.64	6.84	72.17	5.86	78.03	19.79	5.60	25.39	343.51
	Vendor	2,484	262	10	25	15	13.12	401.16	187.57	1.80	57.46	2.47	59.93	16.52	2.36	18.88	90.17
	Worker	5240	262	10	16.8	0	2.48	10.66	139.71	0.55	66.88	0.31	67.19	17.73	0.29	18.02	25.78
						Tons/year	0.11199	1.63769	1.69146	0.00459	0.09826	0.00432	0.10257	0.02702	0.00412	0.03115	459.46
	Turnout, Pipelines, Canal-2025	2025															
	Hauling	24,877	261	10	3.3	15	206.60	2835.95	3030.15	6.67	71.90	5.82	77.71	19.72	5.56	25.28	335.16
	Vendor	2474	261	10	25	15	12.94	398.25	184.76	1.77	57.23	2.46	59.69	16.46	2.35	18.81	88.20
	Worker	5220	261	10	16.8	0	2.14	9.36	128.58	0.53	66.62	0.29	66.92	17.66	0.27	17.93	25.07
						Tons/year	0.11084	1.62178	1.67174	0.00448	0.09788	0.00428	0.10216	0.02692	0.00409	0.03101	448.44
	Turnout, Pipelines, Canal-2026	2026															
	Hauling	9,436	99	10	3.3	15	78.03	1069.63	1144.79	2.48	27.27	2.19	29.46	7.48	2.10	9.57	124.41
	Vendor	939	99	10	25	15	4.87	150.40	69.48	0.66	21.72	0.93	22.65	6.25	0.89	7.14	32.86
	Worker	1980	99	10	16.8	0	0.70	3.15	45.45	0.19	25.27	0.11	25.38	6.70	0.10	6.80	9.26
						Tons/year	0.0418	0.61159	0.62986	0.00166	0.03713	0.00161	0.03875	0.01021	0.00154	0.01175	166.53
Pumpstations	Pumpstations-2023	2023															
	Hauling	154	178	10	3.3	15	1.29	17.75	18.94	0.04	0.45	0.04	0.48	0.12	0.03	0.16	2.16
	Vendor	724	178	10	25	15	3.87	116.87	55.36	0.53	16.75	0.71	17.46	4.82	0.68	5.50	26.70
	Worker	2136	178	10	16.8	0	1.17	4.98	62.01	0.23	27.26	0.13	27.40	7.23	0.12	7.35	10.78
						Tons/year	0.00316	0.0698	0.06815	0.0004	0.02223	0.00044	0.02267	0.00608	0.00042	0.0065	39.63
	Pumpstations-2024	2024															
	Hauling	0	43	10	3.3	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	172	43	10	25	15	0.91	27.78	12.99	0.12	3.98	0.17	4.15	1.14	0.16	1.31	6.24
	Worker	516	43	10	16.8	0	0.24	1.05	13.76	0.05	6.59	0.03	6.62	1.75	0.03	1.77	2.54
						Tons/year	0.00058	0.01441	0.01337	8.9E-05	0.00528	0.0001	0.00538	0.00145	9.6E-05	0.00154	8.78
Start Up/Testing+Float Day	Construction Phase	2026															
	Hauling	0	61	10	3.3	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	0	61	10	25	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	610	61	10	16.8	0	0.22	0.97	14.00	0.06	7.79	0.03	7.82	2.06	0.03	2.09	2.85
						Tons/year	0.00011	0.00049	0.007	3E-05	0.00389	1.6E-05	0.00391	0.00103	1.5E-05	0.00105	2.85

Kern Fan Groundwater Project - Conveyance Facilities Construction
Running Emissions

	Running Emissions Factor (grams/mile)						Running Emissions Factor (grams/mile)		
	ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2023Hauling Hauling	0.02198962	2.363271751	0.21367131	0.01256686	0.0269086	0.02574454	1331.61178	0.00352949	0.20936386
2023Vendor Vendor	0.02026207	1.984551578	0.2405087	0.01159916	0.01746971	0.01671165	1224.43577	0.00271829	0.18019917
2023Worker Worker	0.01481303	0.062981334	0.78380387	0.00291567	0.00169095	0.00155684	298.534417	0.00360237	0.00590441
2024Hauling Hauling	0.02200281	2.362231096	0.21554256	0.01234083	0.02713796	0.02596398	1307.659	0.00340126	0.20559713
2024Vendor Vendor	0.01968046	1.993048637	0.22899882	0.01142225	0.01764369	0.01687812	1205.77103	0.00254427	0.17739062
2024Worker Worker	0.012774	0.054929894	0.71985943	0.00282046	0.00160389	0.0014765	291.229262	0.00315696	0.00540934
2025Hauling Hauling	0.02189736	2.344554894	0.21601156	0.01207935	0.02709653	0.02592434	1279.95547	0.00328471	0.20124099
2025Vendor Vendor	0.0191153	1.989793325	0.21907094	0.01122296	0.01765924	0.01689299	1184.71014	0.00239636	0.17413897
2025Worker Worker	0.01106212	0.048399985	0.66506232	0.00272486	0.00152568	0.00140436	284.338459	0.00277483	0.00499903
2026Hauling Hauling	0.02174724	2.320544005	0.21592856	0.01181059	0.02692296	0.02575828	1251.48626	0.00317822	0.1967646
2026Vendor Vendor	0.0186222	1.980579878	0.21104259	0.01102051	0.01758966	0.01682639	1163.30375	0.00227294	0.17081054
2026Worker Worker	0.00957884	0.042985803	0.61979769	0.00263263	0.00143617	0.00132181	276.978811	0.00244062	0.00465892
GWP	N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/year)						Regional Emissions (MT/year)			
						ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Conveyance Facilitie	Turnout, Pipelines, Canal-2	2023													
	Hauling	16967	178	10	3.3	2.71	291.72	26.38	1.55	3.32	3.18	74.56	0.00	3.40	77.96
	Vendor	1717	178	10	25	1.92	187.80	22.76	1.10	1.65	1.58	52.56	0.00	2.24	54.80
	Worker	3560	178	10	16.8	1.95	8.30	103.35	0.38	0.22	0.21	17.85	0.01	0.10	17.96
	Turnout, Pipelines, Canal-2	2024													
	Hauling	24973	262	10	3.3	4.00	429.18	39.16	2.24	4.93	4.72	107.77	0.01	4.91	112.69
	Vendor	2484	262	10	25	2.69	272.86	31.35	1.56	2.42	2.31	74.88	0.00	3.19	78.08
	Worker	5240	262	10	16.8	2.48	10.66	139.71	0.55	0.31	0.29	25.64	0.01	0.14	25.78
	Turnout, Pipelines, Canal-2	2025													
	Hauling	24877	261	10	3.3	3.96	424.33	39.10	2.19	4.90	4.69	105.08	0.01	4.79	109.87
	Vendor	2474	261	10	25	2.61	271.32	29.87	1.53	2.41	2.30	73.27	0.00	3.12	76.40
	Worker	5220	261	10	16.8	2.14	9.36	128.58	0.53	0.29	0.27	24.94	0.01	0.13	25.07
	Turnout, Pipelines, Canal-2	2026													
	Hauling	9436	99	10	3.3	1.49	159.30	14.82	0.81	1.85	1.77	38.97	0.00	1.78	40.75
	Vendor	939	99	10	25	0.96	102.50	10.92	0.57	0.91	0.87	27.31	0.00	1.16	28.47
	Worker	1980	99	10	16.8	0.70	3.15	45.45	0.19	0.11	0.10	9.21	0.00	0.04	9.26
Pumpstations	Pumpstations-2023	2023													
	Hauling	154	178	10	3.3	0.02	2.65	0.24	0.01	0.03	0.03	0.68	0.00	0.03	0.71
	Vendor	724	178	10	25	0.81	79.19	9.60	0.46	0.70	0.67	22.16	0.00	0.95	23.11
	Worker	2136	178	10	16.8	1.17	4.98	62.01	0.23	0.13	0.12	10.71	0.00	0.06	10.78
	Pumpstations-2024	2024													
	Hauling	0	43	10	3.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	172	43	10	25	0.19	18.89	2.17	0.11	0.17	0.16	5.18	0.00	0.22	5.41
	Worker	516	43	10	16.8	0.24	1.05	13.76	0.05	0.03	0.03	2.52	0.00	0.01	2.54

Kern Fan Groundwater Project - Conveyance Facilities Construction
Idling Emissions

	Idling Emissions Factor (grams/minute)						Idling Emissions Factor (grams/minute)		
	ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2023Hauling Hauling	0.24881098	2.966139031	3.67141608	0.00566727	0.00113581	0.00108668	600.141499	0.01166629	0.09434656
2023Vendor Vendor	0.12770334	1.573650273	1.91148519	0.00298408	0.00065322	0.00062497	315.944859	0.00642698	0.04951708
2023Worker Worker	0	0	0	0	0	0	0	0	0
2024Hauling Hauling	0.2474886	2.947744283	3.65262255	0.00556258	0.00111983	0.00107139	589.049555	0.01159906	0.09260258
2024Vendor Vendor	0.12696582	1.56188622	1.9017452	0.00292987	0.00063348	0.00060608	310.203523	0.00638239	0.04862085
2024Worker Worker	0	0	0	0	0	0	0	0	0
2025Hauling Hauling	0.24631251	2.931467726	3.63580204	0.00545014	0.00110753	0.00105962	577.139295	0.01153985	0.09073007
2025Vendor Vendor	0.12631593	1.551432344	1.89314954	0.00287185	0.00061653	0.00058986	304.059561	0.00634451	0.04766028
2025Worker Worker	0	0	0	0	0	0	0	0	0
2026Hauling Hauling	0.24528733	2.917319783	3.62118238	0.00533591	0.00109632	0.00104889	565.042075	0.0114887	0.08882826
2026Vendor Vendor	0.12575766	1.542364388	1.88581954	0.00281312	0.00060188	0.00057584	297.840818	0.0063133	0.046687
2026Worker Worker	0	0	0	0	0	0	0	0	0
GWP	N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	Idling minutes per Day (miles)	Regional Emissions (pounds/year)						Regional Emissions (MT/year)			
						ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Conveyance Facilitie	Turnout, Pipelines, Canal-2	2023													
	Hauling	16967	178	10	15	139.60	1664.26	2059.99	3.18	0.64	0.61	152.74	0.07	6.96	159.78
	Vendor	1717	178	10	15	7.25	89.35	108.53	0.17	0.04	0.04	8.14	0.00	0.37	8.51
	Worker	3560	178	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Turnout, Pipelines, Canal-2	2024													
	Hauling	24973	262	10	15	204.39	2434.37	3016.48	4.59	0.92	0.88	220.66	0.11	10.06	230.82
	Vendor	2484	262	10	15	10.43	128.30	156.22	0.24	0.05	0.05	11.56	0.01	0.53	12.09
	Worker	5240	262	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Turnout, Pipelines, Canal-2	2025													
	Hauling	24877	261	10	15	202.63	2411.62	2991.05	4.48	0.91	0.87	215.36	0.11	9.82	225.29
	Vendor	2474	261	10	15	10.33	126.93	154.89	0.23	0.05	0.05	11.28	0.01	0.51	11.80
	Worker	5220	261	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Turnout, Pipelines, Canal-2	2026													
	Hauling	9436	99	10	15	76.54	910.33	1129.96	1.67	0.34	0.33	79.98	0.04	3.65	83.66
	Vendor	939	99	10	15	3.91	47.89	58.56	0.09	0.02	0.02	4.20	0.00	0.19	4.39
	Worker	1980	99	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pumpstations	Pumpstations-2023	2023													
	Hauling	154	178	10	15	1.27	15.11	18.70	0.03	0.01	0.01	1.39	0.00	0.06	1.45
	Vendor	724	178	10	15	3.06	37.68	45.77	0.07	0.02	0.01	3.43	0.00	0.16	3.59
	Worker	2136	178	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pumpstations-2024	2024													
	Hauling	0	43	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	172	43	10	15	0.72	8.88	10.82	0.02	0.00	0.00	0.80	0.00	0.04	0.84
	Worker	516	43	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Kern Fan Groundwater Project - Conveyance Facilities Construction
Road Dust, Break Wear, and Tire wear Emissions

	Emission Factors (grams/mile)					
		PM10			PM2.5	
	RD	BW	TW	RD	BW	TW
2023Hauling Hauling	3.00E-01	0.061509934	0.03586453	7.36E-02	0.0263614	0.00896613
2023Vendor Vendor	3.00E-01	0.095924986	0.02393227	7.36E-02	0.04111071	0.00598307
2023Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2024Hauling Hauling	3.00E-01	0.061520383	0.03587055	7.36E-02	0.02636588	0.00896764
2024Vendor Vendor	3.00E-01	0.09593021	0.02393527	7.36E-02	0.04111295	0.00598382
2024Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2025Hauling Hauling	3.00E-01	0.061530018	0.03587608	7.36E-02	0.02637001	0.00896902
2025Vendor Vendor	3.00E-01	0.095935028	0.02393804	7.36E-02	0.04111501	0.00598451
2025Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2026Hauling Hauling	3.00E-01	0.061539607	0.03588159	7.36E-02	0.02637412	0.0089704
2026Vendor Vendor	3.00E-01	0.095939822	0.0239408	7.36E-02	0.04111707	0.0059852
2026Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/year) PM10 RD	PM10 BW	PM10 TW	PM2.5 RD	PM2.5 BW	PM2.5 TW
Conveyance Facilitie	Turnout, Pipelines, Canal-2	2023									
	Hauling	16967	178	10	3.3	37.01	7.59	4.43	9.09	3.25	1.11
	Vendor	1717	178	10	25	28.38	9.08	2.26	6.96	3.89	0.57
	Worker	3560	178	10	16.8	39.54	4.85	1.05	9.70	2.08	0.26
	Turnout, Pipelines, Canal-2	2024									
	Hauling	24973	262	10	3.3	54.48	11.18	6.52	13.37	4.79	1.63
	Vendor	2484	262	10	25	41.05	13.13	3.28	10.08	5.63	0.82
	Worker	5240	262	10	16.8	58.19	7.13	1.55	14.28	3.06	0.39
	Turnout, Pipelines, Canal-2	2025									
	Hauling	24877	261	10	3.3	54.27	11.14	6.49	13.32	4.77	1.62
	Vendor	2474	261	10	25	40.89	13.08	3.26	10.04	5.61	0.82
	Worker	5220	261	10	16.8	57.97	7.11	1.55	14.23	3.05	0.39
	Turnout, Pipelines, Canal-2	2026									
	Hauling	9436	99	10	3.3	20.58	4.22	2.46	5.05	1.81	0.62
	Vendor	939	99	10	25	15.52	4.97	1.24	3.81	2.13	0.31
	Worker	1980	99	10	16.8	21.99	2.70	0.59	5.40	1.16	0.15
Pumpstations	Pumpstations-2023	2023									
	Hauling	154	178	10	3.3	0.34	0.07	0.04	0.08	0.03	0.01
	Vendor	724	178	10	25	11.97	3.83	0.95	2.94	1.64	0.24
	Worker	2136	178	10	16.8	23.72	2.91	0.63	5.82	1.25	0.16
	Pumpstations-2024	2024									
	Hauling	0	43	10	3.3	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	172	43	10	25	2.84	0.91	0.23	0.70	0.39	0.06
	Worker	516	43	10	16.8	5.73	0.70	0.15	1.41	0.30	0.04

Project Operational Emissions

Kern Fan Groundwater

Unmitigated AQ Emissions Summary of Operations

Unitigated Construction and Umitigated Operational Emissions During Year 2026 and Unmitigated Operational Emissions For the First Full Year of Operations In Year 2027 in Tons/Year

YEAR	EMISSIONS (TONS/YEAR)					
	VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
Construction						
2026	0.11	1.24	1.32	0.003	0.05	0.03
Operations						
2026	0.16	1.79	1.48	0.004	0.38	0.08
Total	0.27	3.02	2.80	0.01	0.43	0.11
Operations						
2027	0.16	1.78	1.47	0.004	0.38	0.08
Maximum	**0.27**	**3.02**	**2.80**	**0.01**	**0.43**	**0.11**
De Minimis Thresholds	10	10	100	100	100	70
Exceeds De Minimis?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Kern Fan Groundwater

Unmitigated AQ Emissions Summary of Operations

Mitigated Construction and Umitigated Operational Emissions During Year 2026 and Unmitigated Operational Emissions For the First Full Year of Operations In Year 2027 in Tons/Year

YEAR	EMISSIONS (TONS/YEAR)					
	VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
Construction						
2026	0.07	1.17	1.65	0.003	0.05	0.005
Operations						
2026	0.16	1.79	1.48	0.004	0.38	0.08
Total	0.23	2.95	3.13	0.01	0.43	0.09
Operations						
2027	0.16	1.78	1.47	0.004	0.38	0.08
Maximum	**0.23**	**2.95**	**3.13**	**0.01**	**0.43**	**0.09**
De Minimis Thresholds	10	10	100	100	100	70
Exceeds De Minimis?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Kern Fan Groudwater

GHG Emissions Summary of Operations

Construction and Operational Emissions During Year 2026 and Operational Emissions For the First Full Year of Operations In Year 2027 in Tons/Year

YEAR	EMISSIONS (METRIC TONS/YEAR)
	CO2e
Construction	
2026	312.30
Operations	
2026	1545.83
Total	1858.13
Amortized Construction	
2027	258.15
Operations	
2027	3269.11
Total	3527.27
Maximum	**3527.27**
Significance Threshold	10000.00
Exceeds De Minimis?	**NO**

Kern Fan Groudwater
Energy Consumption - GHG Emissions
Wells and Pump Stations

Estimated GHG Emissiosn from Electricity demand from Wells and Pump Stations

Land Use Type		Number of Wells	AF/Year	Average Consumption (kWh/AF) [c]	Days/Year	Electricity Demand (kWh/yr)
	Well Energy Consumption	12	50,000	600.00	365	30,000,000
	Pump Station Energy Consumption	3	100000.00	90.00	365	9,000,000
						39,000,000

Notes:

a. AF/year for well and pump station from PD

b. Number of wells and pump stations from PD

c. Electricity consumption kwh/AF based on values from PD

		GHG Emissions (lbs/yr)					
Year	**Source**	**Electricity Demand (million kWh)**	**CO2**	**CH4**	**N20**	**CO2e**	**MTCO2e (MT/yr)**
2026	Total Energy Consumption	15.0000	2,532,750	435.00	90.00	2,570,445	1,165.9
		Electricity Demand (million kWh)	**CO2**	**CH4**	**N20**	**CO2e**	**MTCO2e (MT/yr)**
2027	Total Energy Consumption	39.0000	6,321,900.00	1,131.00	90.00	6,376,995	2,892.6

d. Project assumed to be operational by 8/13/2026, therefore 2026 energy consumption adjusted to account for partial year of operations for wells and pump stations

	Year 2026	Year 2027
GHG	**Intensity factor (lbs/MWh)**	**Intensity factor (lbs/MWh)**
CO2	168.85	162.1
CH4	0.029	0.029
N2O	0.006	0.006

Operations-Weed+Pest - Kern-San Joaquin County, Annual

Operations-Weed+Pest

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1,300.00	Acre	1,300.00	56,628,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2027
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	168.85	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor linearly adjusted to account for RPS standard by year 2026

Land Use -

Construction Phase - see operational assumptions

Off-road Equipment - see operational assumptions. other construction equipment accounts for spray rig

Trips and VMT - operational mobile emissions calculated outside of CalEEMod

Energy Use -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value

tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	6,000.00	20.00
tblConstructionPhase	PhaseEndDate	12/10/2087	9/9/2026
tblConstructionPhase	PhaseStartDate	12/11/2064	8/13/2026
tblGrading	AcresOfGrading	10.00	0.00
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	168.85
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2026	8.0100e-003	0.0801	0.0828	1.7000e-004	0.0000	3.4900e-003	3.4900e-003	0.0000	3.2100e-003	3.2100e-003	0.0000	14.9711	14.9711	4.8400e-003	0.0000	15.0921
Maximum	**8.0100e-003**	**0.0801**	**0.0828**	**1.7000e-004**	**0.0000**	**3.4900e-003**	**3.4900e-003**	**0.0000**	**3.2100e-003**	**3.2100e-003**	**0.0000**	**14.9711**	**14.9711**	**4.8400e-003**	**0.0000**	**15.0921**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2026	8.0100e-003	0.0801	0.0828	1.7000e-004	0.0000	3.4900e-003	3.4900e-003	0.0000	3.2100e-003	3.2100e-003	0.0000	14.9710	14.9710	4.8400e-003	0.0000	15.0921
Maximum	**8.0100e-003**	**0.0801**	**0.0828**	**1.7000e-004**	**0.0000**	**3.4900e-003**	**3.4900e-003**	**0.0000**	**3.2100e-003**	**3.2100e-003**	**0.0000**	**14.9710**	**14.9710**	**4.8400e-003**	**0.0000**	**15.0921**

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

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**8-13-2026**	**9-30-2026**	0.0881	0.0881
		Highest	0.0881	0.0881

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	8/13/2026	9/9/2026	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 1300

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Crawler Tractors	1	8.00	212	0.43
Site Preparation	Other Construction Equipment	1	8.00	172	0.42
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.0100e-003	0.0801	0.0828	1.7000e-004		3.4900e-003	3.4900e-003		3.2100e-003	3.2100e-003	0.0000	14.9711	14.9711	4.8400e-003	0.0000	15.0921
Total	**8.0100e-003**	**0.0801**	**0.0828**	**1.7000e-004**	**0.0000**	**3.4900e-003**	**3.4900e-003**	**0.0000**	**3.2100e-003**	**3.2100e-003**	**0.0000**	**14.9711**	**14.9711**	**4.8400e-003**	**0.0000**	**15.0921**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.0100e-003	0.0801	0.0828	1.7000e-004		3.4900e-003	3.4900e-003		3.2100e-003	3.2100e-003	0.0000	14.9710	14.9710	4.8400e-003	0.0000	15.0921
Total	**8.0100e-003**	**0.0801**	**0.0828**	**1.7000e-004**	**0.0000**	**3.4900e-003**	**3.4900e-003**	**0.0000**	**3.2100e-003**	**3.2100e-003**	**0.0000**	**14.9710**	**14.9710**	**4.8400e-003**	**0.0000**	**15.0921**

Mitigated Construction Off-Site

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

Operations-Earthwork - Kern-San Joaquin County, Annual

Operations-Earthwork

Kern-San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1,300.00	Acre	1,300.00	56,628,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	32
Climate Zone	3			**Operational Year**	2027
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	168.85	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor linearly adjusted to account for RPS standard by year 2026

Land Use -

Construction Phase - see operational assumptions

Off-road Equipment - see operational assumptions

Grading - see operational assumptions

Trips and VMT - operational mobile emissions calculated outside of CalEEMod

Energy Use -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	15,500.00	90.00
tblConstructionPhase	PhaseEndDate	5/10/2147	12/16/2026
tblConstructionPhase	PhaseStartDate	12/11/2087	8/13/2026
tblGrading	AcresOfGrading	180.00	1,300.00
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	168.85
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	15.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2026	0.0822	0.8344	0.4654	1.8600e-003	0.6893	0.0295	0.7189	0.0744	0.0272	0.1016	0.0000	163.7049	163.7049	0.0530	0.0000	165.0285
Maximum	**0.0822**	**0.8344**	**0.4654**	**1.8600e-003**	**0.6893**	**0.0295**	**0.7189**	**0.0744**	**0.0272**	**0.1016**	**0.0000**	**163.7049**	**163.7049**	**0.0530**	**0.0000**	**165.0285**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2026	0.0822	0.8344	0.4654	1.8600e-003	0.3102	0.0295	0.3397	0.0335	0.0272	0.0607	0.0000	163.7047	163.7047	0.0530	0.0000	165.0284
Maximum	**0.0822**	**0.8344**	**0.4654**	**1.8600e-003**	**0.3102**	**0.0295**	**0.3397**	**0.0335**	**0.0272**	**0.0607**	**0.0000**	**163.7047**	**163.7047**	**0.0530**	**0.0000**	**165.0284**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**55.00**	**0.00**	**52.74**	**55.00**	**0.00**	**40.29**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**8-13-2026**	**9-30-2026**	0.3565	0.3565
		Highest	0.3565	0.3565

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	8/13/2026	12/16/2026	5	90	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1300

Acres of Paving: 1300

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Crawler Tractors	2	8.00	212	0.43
Grading	Rubber Tired Loaders	2	8.00	203	0.36
Grading	Excavators	0	8.00	158	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Graders	2	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Scrapers	0	8.00	367	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	6	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6893	0.0000	0.6893	0.0744	0.0000	0.0744	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0822	0.8344	0.4654	1.8600e-003		0.0295	0.0295		0.0272	0.0272	0.0000	163.7049	163.7049	0.0530	0.0000	165.0285
Total	**0.0822**	**0.8344**	**0.4654**	**1.8600e-003**	**0.6893**	**0.0295**	**0.7189**	**0.0744**	**0.0272**	**0.1016**	**0.0000**	**163.7049**	**163.7049**	**0.0530**	**0.0000**	**165.0285**

Unmitigated Construction Off-Site

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

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3102	0.0000	0.3102	0.0335	0.0000	0.0335	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0822	0.8344	0.4654	1.8600e-003		0.0295	0.0295		0.0272	0.0272	0.0000	163.7047	163.7047	0.0530	0.0000	165.0284
Total	**0.0822**	**0.8344**	**0.4654**	**1.8600e-003**	**0.3102**	**0.0295**	**0.3397**	**0.0335**	**0.0272**	**0.0607**	**0.0000**	**163.7047**	**163.7047**	**0.0530**	**0.0000**	**165.0284**

Mitigated Construction Off-Site

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

Kern Fan Groundwater Project - Operations

Total On-Road Emissions

Kern Fan Groundwater Project - Operations

Total On-Road Emissions

260 Max construction days per year

	Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (pounds/year) ROG	NOX	CO	SO2	PM10 Dust	PM10 Exh	Total PM10	PM2.5 Dust	PM2.5 Exh	Total PM2.5	(MT/yr) Total CO2e
Weed+Pest	Weed+Pest	2026															
		0															
	Hauling	0	20	10	3.3	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	40	20	10	25	15	0.21	6.41	2.96	0.03	0.93	0.04	0.96	0.27	0.04	0.30	1.40
	Worker	80	20	10	16.8	0	0.03	0.13	1.84	0.01	1.02	0.00	1.03	0.27	0.00	0.27	0.37
						Tons/year	0.00012	0.00327	0.0024	1.8E-05	0.00097	2.2E-05	0.001	0.00027	2.1E-05	0.00029	1.77
Weed+Pest	Weed+Pest	2027															
		0															
	Hauling	0	20	10	3.3	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vendor	40	20	10	25	15	0.21	6.37	2.94	0.03	0.93	0.04	0.96	0.27	0.04	0.30	1.37
	Worker	80	20	10	16.8	0	0.02	0.11	1.72	0.01	1.02	0.00	1.03	0.27	0.00	0.27	0.37
						Tons/year	0.00012	0.00324	0.00233	1.8E-05	0.00097	2.2E-05	0.00099	0.00027	2.1E-05	0.00029	1.74
Earthwork	Earthwork	2026															
		0															
	Hauling	10,924	90	10	3.3	15	90.34	1238.31	1325.31	2.87	31.57	2.54	34.11	8.66	2.43	11.08	144.03
	Vendor	0	90	10	25	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	720	90	10	16.8	0	0.26	1.15	16.53	0.07	9.19	0.04	9.23	2.44	0.04	2.47	3.37
						Tons/year	0.0453	0.61973	0.67092	0.00147	0.02038	0.00129	0.02167	0.00555	0.00123	0.00678	147.40
Earthwork	Earthwork	2027															
		0															
	Hauling	10,924	90	10	3.3	15	90.09	1232.70	1321.92	2.80	31.57	2.52	34.09	8.66	2.41	11.07	140.91
	Vendor	0	90	10	25	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Worker	720	90	10	16.8	0	0.22	1.03	15.51	0.07	9.19	0.04	9.23	2.44	0.03	2.47	3.29
						Tons/year	0.04516	0.61687	0.66872	0.00144	0.02038	0.00128	0.02166	0.00555	0.00122	0.00677	144.20

Kern Fan Groundwater Project - Operations
Running Emissions

	Running Emissions Factor (grams/mile)						Running Emissions Factor (grams/mile)		
	ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2024Hauling Hauling	0.02200281	2.362231096	0.21554256	0.01234083	0.02713796	0.02596398	1307.659	0.00340126	0.20559713
2024Vendor Vendor	0.01968046	1.993048637	0.22899882	0.01142225	0.01764369	0.01687812	1205.77103	0.00254427	0.17739062
2024Worker Worker	0.012774	0.054929894	0.71985943	0.00282046	0.00160389	0.0014765	291.229262	0.00315696	0.00540934
2025Hauling Hauling	0.02189736	2.344554894	0.21601156	0.01207935	0.02709653	0.02592434	1279.95547	0.00328471	0.20124099
2025Vendor Vendor	0.0191153	1.989793325	0.21907094	0.01122296	0.01765924	0.01689299	1184.71014	0.00239636	0.17413897
2025Worker Worker	0.01106212	0.048399985	0.66506232	0.00272486	0.00152568	0.00140436	284.338459	0.00277483	0.00499903
2026Hauling Hauling	0.02174724	2.320544005	0.21592856	0.01181059	0.02692296	0.02575828	1251.48626	0.00317822	0.1967646
2026Vendor Vendor	0.0186222	1.980579878	0.21104259	0.01102051	0.01758966	0.01682639	1163.30375	0.00227294	0.17081054
2026Worker Worker	0.00957884	0.042985803	0.61979769	0.00263263	0.00143617	0.00132181	276.978811	0.00244062	0.00465892
2027Hauling Hauling	0.02158374	2.293702597	0.21549832	0.01152377	0.02670689	0.02555156	1221.09694	0.00306749	0.19198619
2027Vendor Vendor	0.01819467	1.967422529	0.2043867	0.0108012	0.01748213	0.01672348	1140.1201	0.0021616	0.16725563
2027Worker Worker	0.00840532	0.038581433	0.5815609	0.00255585	0.00134997	0.00124228	270.979245	0.00217589	0.00438489
GWP	N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/year)						Regional Emissions (MT/year)			
					ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Weed+Pest	2026													
Hauling	0	20	10	3.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	40	20	10	25	0.04	4.37	0.47	0.02	0.04	0.04	1.16	0.00	0.05	1.21
Worker	80	20	10	16.8	0.03	0.13	1.84	0.01	0.00	0.00	0.37	0.00	0.00	0.37
Weed+Pest	2027													
Hauling	0	20	10	3.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	40	20	10	25	0.04	4.34	0.45	0.02	0.04	0.04	1.14	0.00	0.05	1.19
Worker	80	20	10	16.8	0.02	0.11	1.72	0.01	0.00	0.00	0.36	0.00	0.00	0.37
Earthwork	2026													
Hauling	10924	90	10	3.3	1.73	184.42	17.16	0.94	2.14	2.05	45.12	0.00	2.06	47.17
Vendor	0	90	10	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	720	90	10	16.8	0.26	1.15	16.53	0.07	0.04	0.04	3.35	0.00	0.02	3.37
Earthwork	2027													
Hauling	10924	90	10	3.3	1.72	182.29	17.13	0.92	2.12	2.03	44.02	0.00	2.01	46.03
Vendor	0	90	10	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	720	90	10	16.8	0.22	1.03	15.51	0.07	0.04	0.03	3.28	0.00	0.02	3.29

Kern Fan Groundwater Project - Operations
Idling Emissions

	Idling Emissions Factor (grams/minute)						Idling Emissions Factor (grams/minute)		
	ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
2024Hauling Hauling	0.2474886	2.947744283	3.65262255	0.00556258	0.00111983	0.00107139	589.049555	0.01159906	0.09260258
2024Vendor Vendor	0.12696582	1.56188622	1.9017452	0.00292987	0.00063348	0.00060608	310.203523	0.00638239	0.04862085
2024Worker Worker	0	0	0	0	0	0	0	0	0
2025Hauling Hauling	0.24631251	2.931467726	3.63580204	0.00545014	0.00110753	0.00105962	577.139295	0.01153985	0.09073007
2025Vendor Vendor	0.12631593	1.551432344	1.89314954	0.00287185	0.00061653	0.00058986	304.059561	0.00634451	0.04766028
2025Worker Worker	0	0	0	0	0	0	0	0	0
2026Hauling Hauling	0.24528733	2.917319783	3.62118238	0.00533591	0.00109632	0.00104889	565.042075	0.0114887	0.08882826
2026Vendor Vendor	0.12575766	1.542364388	1.88581954	0.00281312	0.00060188	0.00057584	297.840818	0.0063133	0.046687
2026Worker Worker	0	0	0	0	0	0	0	0	0
2027Hauling Hauling	0.24462766	2.907717924	3.61190339	0.00522706	0.00108746	0.00104042	553.514608	0.01145472	0.087016
2027Vendor Vendor	0.12538853	1.535733329	1.88116181	0.00275696	0.00058996	0.00056444	291.895179	0.00629092	0.04575641
2027Worker Worker	0	0	0	0	0	0	0	0	0
GWP	N/A	N/A	N/A	N/A	N/A	N/A	1	25	290

Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	Idling minutes per Day (miles)	Regional Emissions (pounds/year)						Regional Emissions (MT/year)			
					ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
Weed+Pest	2026													
Hauling	0	20	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	40	20	10	15	0.17	2.04	2.49	0.00	0.00	0.00	0.18	0.00	0.01	0.19
Worker	80	20	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Weed+Pest	2027													
Hauling	0	20	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	40	20	10	15	0.17	2.03	2.49	0.00	0.00	0.00	0.18	0.00	0.01	0.18
Worker	80	20	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Earthwork	2026													
Hauling	10924	90	10	15	88.61	1053.88	1308.15	1.93	0.40	0.38	92.59	0.05	4.22	96.86
Vendor	0	90	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	720	90	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Earthwork	2027													
Hauling	10924	90	10	15	88.37	1050.41	1304.80	1.89	0.39	0.38	90.70	0.05	4.13	94.88
Vendor	0	90	10	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	720	90	10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Kern Fan Groundwater Project - Operations
Road Dust, Break Wear, and Tire wear Emissions

	Emission Factors (grams/mile)					
	PM10			PM2.5		
	RD	BW	TW	RD	BW	TW
2024Hauling Hauling	3.00E-01	0.061520383	0.03587055	7.36E-02	0.02636588	0.00896764
2024Vendor Vendor	3.00E-01	0.09593021	0.02393527	7.36E-02	0.04111295	0.00598382
2024Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2025Hauling Hauling	3.00E-01	0.061530018	0.03587608	7.36E-02	0.02637001	0.00896902
2025Vendor Vendor	3.00E-01	0.095935028	0.02393804	7.36E-02	0.04111501	0.00598451
2025Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2026Hauling Hauling	3.00E-01	0.061539607	0.03588159	7.36E-02	0.02637412	0.0089704
2026Vendor Vendor	3.00E-01	0.095939822	0.0239408	7.36E-02	0.04111707	0.0059852
2026Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002
2027Hauling Hauling	3.00E-01	0.061548634	0.03588678	7.36E-02	0.02637799	0.00897169
2027Vendor Vendor	3.00E-01	0.095944336	0.02394339	7.36E-02	0.041119	0.00598585
2027Worker Worker	3.00E-01	0.036750011	0.008	7.36E-02	0.01575	0.002

Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Regional Emissions (pounds/year)					
					PM10			PM2.5		
					RD	BW	TW	RD	BW	TW
Weed+Pest	2026									
Hauling	0	20	10	3.3	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	40	20	10	25	0.66	0.21	0.05	0.16	0.09	0.01
Worker	80	20	10	16.8	0.89	0.11	0.02	0.22	0.05	0.01
Weed+Pest	2027									
Hauling	0	20	10	3.3	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	40	20	10	25	0.66	0.21	0.05	0.16	0.09	0.01
Worker	80	20	10	16.8	0.89	0.11	0.02	0.22	0.05	0.01
Earthwork	2026									
Hauling	10924	90	10	3.3	23.83	4.89	2.85	5.85	2.10	0.71
Vendor	0	90	10	25	0.00	0.00	0.00	0.00	0.00	0.00
Worker	720	90	10	16.8	8.00	0.98	0.21	1.96	0.42	0.05
Earthwork	2027									
Hauling	10924	90	10	3.3	23.83	4.89	2.85	5.85	2.10	0.71
Vendor	0	90	10	25	0.00	0.00	0.00	0.00	0.00	0.00
Worker	720	90	10	16.8	8.00	0.98	0.21	1.96	0.42	0.05

Appendix D

Biological Resources Technical Report

ESA

Draft

KERN FAN GROUNDWATER STORAGE PROJECT

Biological Resources Technical Report

Prepared for
Irvine Ranch Water District and
Rosedale-Rio Bravo Water Storage District

October 2020

ESA

Draft

KERN FAN GROUNDWATER STORAGE PROJECT

Biological Resources Technical Report

Prepared for
Irvine Ranch Water District and
Rosedale-Rio Bravo Water Storage District

October 2020

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Name and Title Date

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EXECUTIVE SUMMARY

IRWD Kern Fan Groundwater Storage Project Biological Resources Technical Report

A literature review, desktop GIS analysis, and field reconnaissance were conducted for the Kern Fan Groundwater Storage Project (proposed project). The proposed project would convert agricultural lands into water recharge basins and construct conveyance facility infrastructure. A background investigation of the proposed project sites (project sites) was conducted that included queries of the California Natural Diversity Database (CNDDB) and California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants. A biological resource reconnaissance was conducted in July 2020 for the proposed project to gather baseline biological resources data prior to project commencement. Results of the reconnaissance, in combination with the findings of the background investigation, were used to assess the potential for project sites to support special-status plant and wildlife species and sensitive natural communities and to investigate the potential for jurisdictional resources to occur on the proposed project sites. Also provided is an analysis of the potential impacts to these biological resources that may result from implementing the proposed project.

The project sites are mostly developed or disturbed; however, several vegetation communities were observed or documented during the field and desktop reconnaissance. The project sites currently support 13 vegetation communities and four land cover types. The project sites are largely developed (residential) and disturbed (agricultural fields and recharge basins). Five sensitive natural communities were identified within the project sites during the reconnaissance.

The project sites currently support a diversity of common and special-status wildlife and plant species that may be impacted during construction, operations and maintenance. Special-status wildlife species that have a medium to high potential to occur on site and to be potentially impacted by the proposed project include burrowing owl, tricolored blackbird, Tipton kangaroo rat, blunt-nosed leopard lizard, Nelson's antelope squirrel, and San Joaquin kit fox. Biologists observed two individual Swainson's hawks, one California horned lark (audio detection), and one deceased American badger during the reconnaissance on July 6 and 7, 2020. No special-status plant species were observed or detected; however, seven species have a medium potential to occur based on dispersal of vegetation communities on site. These species include: California jewelflower, Hoover's eriastrum, Kern mallow, recurved larkspur, San Joaquin woollythreads, slough thistle, and subtle orache.

The proposed project is expected to result in both adverse and beneficial impacts to biological resources during project construction, operations, and maintenance. Impact mechanisms include habitat modification (adverse and beneficial), pesticide use (adverse), exterior lighting (adverse), and vehicle collisions (adverse). These impact mechanisms were evaluated in terms of the CEQA thresholds of significance for biological resources. For those thresholds for which the proposed project would result in significant adverse impacts, mitigation measures were proposed. This included the potential for significant impacts to special-status plants and wildlife, nesting birds, sensitive natural communities, wetland and jurisdiction resources, local ordinances, and an adopted NCCP/HCP. Mitigation measures were designed to reduce these potentially significant impacts to less than significant. For all potential impacts, implementation of mitigation measures would reduce impacts to a level that is less than significant.

CHAPTER 1
Introduction

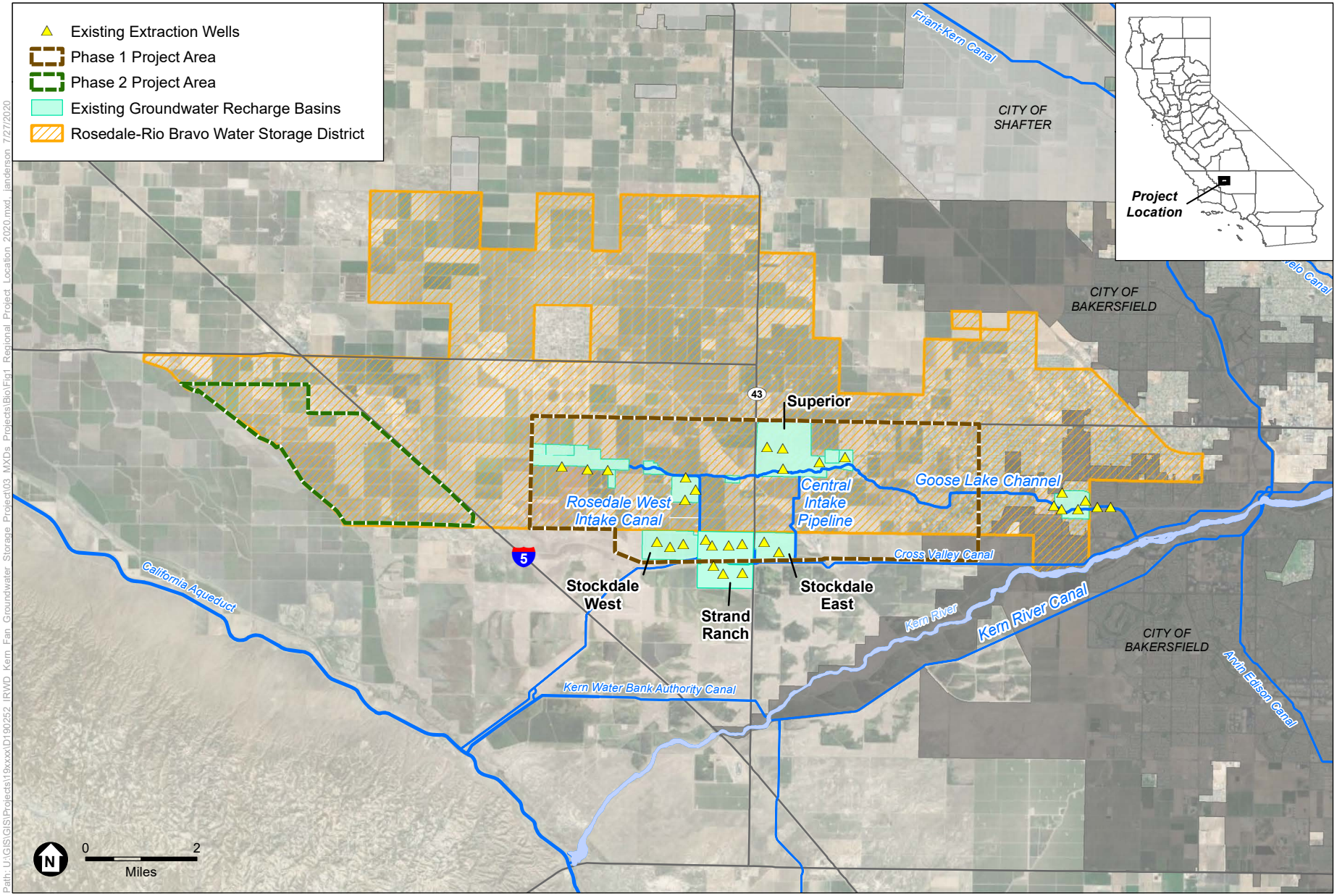
1.1 Project Location and Background

The proposed project would be located in western Kern County, west of the City of Bakersfield. The proposed recharge and recovery facilities would be constructed in two phases on approximately 1,300 acres of agricultural or vacant land within or near the Rosedale-Rio Bravo Water Storage District (Rosedale) service area (**Figure 1**). The proposed project would also involve the acquisition of easements for construction, operation and maintenance of proposed Kern Fan Conveyance Facilities that would deliver water to and from the California Aqueduct. The proposed project would allow the Rosedale and Irvine Ranch Water District (IRWD) to more effectively manage sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County, California. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial (M&I) uses. The proposed project would involve the construction and operation of water conveyance, recharge and recovery facilities.

This Biological Resources Technical Report (BRTR) assesses the Phase 1, Phase 2, and the Kern Fan Conveyance Facilities (conveyance facilities) project sites. All three sites are depicted on **Figure 2** and are collectively referred to as the "project sites." The Phase 1 and Phase 2 project sites bound the area within which the proposed recharge and recovery facilities would be located. They are approximately 640 acres each and mainly consist of agricultural lands that contain alfalfa, cotton, potatoes, grapes, and pistachio. The conveyance facilities project site bounds the area within the proposed conveyance facilities would be located. It is approximately 11,954 acres and consists of numerous native vegetation communities as well as non-native grasslands and agriculture lands.

1.2 Project Description

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. The Kern Fan Conveyance Facilities would consist of pipelines, pump stations, and a new turnout at the California Aqueduct to convey water between the project facilities and the California Aqueduct. Water stored by the proposed project would be recovered when needed to provide ecosystem and water supply benefits.



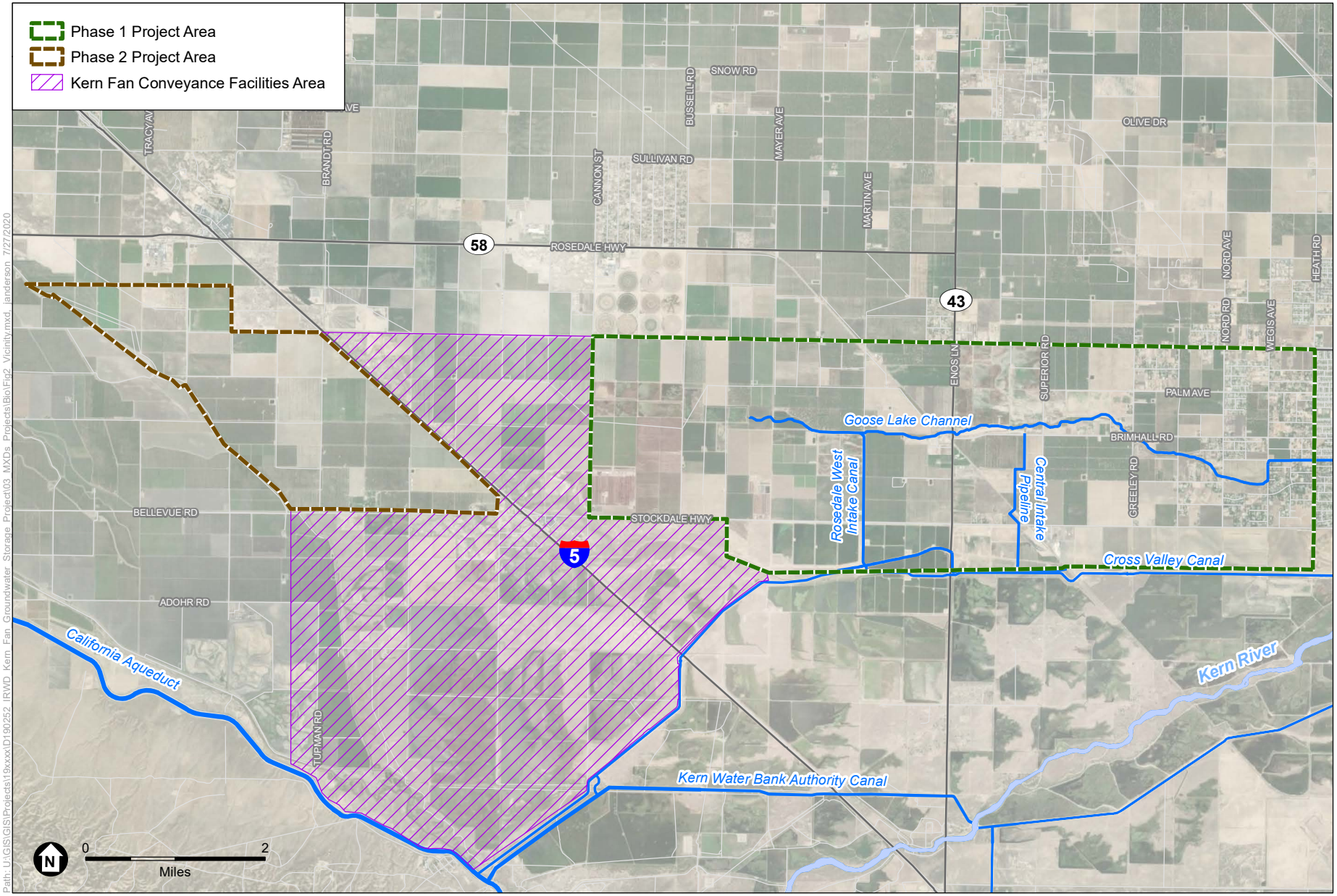
SOURCE: ESRI; Kern County

Kern Fan Groundwater Storage Project

Figure 1

Regional Project Location

ESA



SOURCE: ESRI; Kern County

Kern Fan Groundwater Storage Project

Figure 2

Vicinity Map

ESA

The proposed project would be operated such that surplus surface water from the SWP and other available water sources would be recharged and stored for subsequent recovery. It is estimated that the proposed project would be able to recharge and store approximately 100,000 acre-feet per year (AFY). Proposed project capacities are to be allocated as follows:

- Up to 25,000 acre-feet (AF), of State Water Project (SWP) Article 21 water and Central Valley Project (CVP) water, including Friant 215 water, would be stored for the California Department of Water Resources (DWR) in an "Ecosystem Account." Through the implementation of 1-for-1 exchanges, the water stored in the Ecosystem Account would be used by the State of California to alleviate stress on endangered and threatened species in the Sacramento-San Joaquin River Delta during dry or critically dry years. The stored CVP water would be used to provide operational flexibility benefits to the CVP and incremental supplies to Federal wildlife refuges.
- The remaining 75,000 AF of storage capacity would be divided equally, with 37,500 AF of storage capacity allocated to Rosedale and 37,500 AF of storage capacity allocated to IRWD. Rosedale and IRWD would use the water recharged in their respective accounts for agriculture, municipal, and industrial uses, improving water supply reliability during droughts and emergencies.
- The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project sites. Water could be conveyed to and from Phase 1 and 2 project sites through existing facilities and a new turnout and conveyance system (Kern Fan Conveyance Facilities) connecting to the California Aqueduct.

Recharge Facilities

The proposed project would include the construction of recharge basins of varying shape, size, and depth within approximately 1,300 acres. Basins would be formed by excavating and contouring existing soils to form earthen berms. Typical basin berms would be approximately three to six feet above ground. Dirt roads approximately 14 to 20 feet wide would run along the perimeter of and in between all basins to provide access to facilities during operation and maintenance activities. Surface water would be delivered to the basins for recharge through the new Kern Fan Conveyance Facilities, and the basins would be connected by check structures to allow recharge water to flow by gravity among basins. The basins would be managed to allow agricultural land uses (e.g., annual farming or grazing) to continue when the basins are empty.

Recharge Water Supplies

The proposed project would receive, recharge, and store SWP Article 21 water, which is a surplus supply managed by DWR. Other water supplies also may be secured and acquired by Rosedale and IRWD from various sources, and may include federal, state, and local supplies through transfers, balanced and unbalanced water exchange agreements, water purchases or temporary transfers, or other available means. Sources may also include supplies from the Central Valley Project, and high-flow Kern River water depending on annual hydrologic availability, water rights, and regulatory considerations.

Recovery Facilities

The proposed project would construct up to 12 extraction wells, with an anticipated annual recovery capacity of up to 50,000 AF. Each well would be designed to pump groundwater at a recovery rate of approximately five to six cubic feet per second (cfs). Actual recovery rates for each well may be slightly more or less based on aquifer conditions at each well site. If higher production is achieved for the first few wells installed, fewer wells may be needed. Additionally, if any agricultural wells exist on the recharge basin sites, these could potentially be used as production wells or monitoring wells. The proposed recovery facilities would be designed and located to minimize potential effects on wells pumping on adjacent properties.

Conveyance Facilities

The proposed project includes a new turnout, additional canals and pipelines, and pump stations (collectively the "Kern Fan Conveyance Facilities") to convey water to and from the California Aqueduct and proposed recharge and recovery facilities. The exact locations of the new conveyance facilities have not yet been determined but would have up to 500 cfs of conveyance capacity. Subject to necessary approvals, water could be conveyed through the SWP, Friant-Kern Canal, or the Kern River by exchange through the Goose Lake Channel, or from the Cross Valley Canal (CVC) through the Rosedale Intake Canal. Groundwater recovered from the proposed project extraction wells would be conveyed through new pipelines that would be below ground, running along the dirt roads between the recharge basins, or buried in the basin bottoms, with exact locations subject to final well placement. The recovery pipelines would connect to the new Kern Fan Conveyance Facilities or could connect to the CVC via existing conveyance facilities.

Recharge Basin Design and Operation for Wetland Benefits

Since the recharge basins will be intermittently flooded with captured stream flows that are diverted into the California Aqueduct, through the proposed project canal and into man-made impoundments, the wetlands that will be incidentally created by the constructed recharge basins will most closely resemble a classification of *Intermittent Flooded Riverine Wetlands with Unconsolidated Sandy Bottoms*. Accordingly, the recharge basins constructed for the proposed project will be designed to meet intermittent wetland requirements during recharge operations (IRWD 2020).

As described in the Project Feasibility Report (Dee Jasper 2017), the proposed project will establish intermittent wetland habitat through intermittent recharge events. The primary purpose of the proposed project is to construct and operate recharge basins that allow water to infiltrate and recharge into the underlying aquifer for storage until it is needed. During the years that the proposed project takes and recharges water into storage, the basins will be inundated with water and will provide intermittent wetland habitat to support waterfowl, shorebirds, raptors and other migratory birds along the Pacific Flyway (described in further detail in Section 4.9). The wetlands to be established by the proposed project are considered intermittent because the water supply delivered for recharge may not be available for recharge year-round or during periods of drought (IRWD 2020).

The Kern Water Bank is located to the south of the proposed project and represents a reference site for the future conditions of the recharge basins and the intermittent wetland establishment. The Kern Water Bank spans 20,000 acres of water recharge and recovery infrastructure. Through 2018, over 206 species of birds have been identified on Kern Water Bank lands (Kern Water Bank Authority 2019). It is anticipated that the proposed project will result in similar habitat conditions at a smaller scale within the 1,300 acres of recharge basins.

CHAPTER 2
Methodology

2.1 Existing Literature and Database Review

The private ownership of the project sites required a combination of a desktop analysis and field-based biological resource reconnaissance (reconnaissance) to assess the biological resources. Prior to conducting the reconnaissance, Environmental Science Associates (ESA) conducted a thorough review of available information regarding the present biological conditions of the project sites and vicinity. The following resources were referenced for the analyses of this report:

- California Department of Fish and Wildlife (CDFW) California Natural Diversity Data Base (CNDDB) was queried for special status species records within the Stevens United States Geological Survey (USGS) topographic quadrangle and surrounding eight quadrangles. These eight quadrangles include: East Elk Hills, Tupman, Rosedale, Millux, Mouth of Kern, Taft, and Buttonwillow (CDFW 2020).
- California Native Plant Society (CNPS), Inventory of Rare and Endangered Vascular Plants of California was queried for special status species records within the Stevens USGS topographic quadrangle and surrounding eight quadrangles. These eight quadrangles include: East Elk Hills, Tupman, Rosedale, Millux, Mouth of Kern, Taft, and Buttonwillow (CNPS 2020).
- United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System for Critical Habitat.
- Historical aerial imagery (Google Earth Pro. 2020).
- United States Department of Agriculture (USDA) Soil Survey Geographic Data Base (USDA 2020).
- Biological Technical Report for the Stockdale Integrated Banking Project (ESA 2013).
- Technical Memorandum for Ecosystem Benefits from Kern Fan Groundwater Storage Project (Cramer Fish Sciences 2020).
- Metropolitan Bakersfield Habitat Conservation Plan (City of Bakersfield and Kern County 2002).
- Final Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan (KWBA 1997).

2.2 Biological Resource Reconnaissance

Field reconnaissance was conducted by ESA senior biologists Travis Marella and Karl Fairchild on July 6 and 7, 2020. Weather conditions at the time of the reconnaissance consisted of temperatures averaging 100 degrees Fahrenheit (ºF), clear skies and wind speeds ranging from zero to five miles per hour (mph). The purpose of the reconnaissance was to identify, map and characterize natural resources present or with potential to occur on and adjacent to the project sites.

The Phase 1 and Phase 2 project sites were surveyed by foot and by vehicle to determine if the sites and immediately adjacent areas have the potential to support any special-status plant or wildlife species, or sensitive natural communities. The Phase 1 and Phase 2 project sites surveys were mainly conducted by driving around the perimeter on access roads and surveying as much as the interior areas as possible using 10x42 binoculars. Key locations (e.g., Tule Elk State Reserve) with possible sensitive resources were visited in the conveyance facilities project site.

The Phase 1 and Phase 2 project sites were surveyed with a 500-foot buffer to assess the adjacent areas where special-status species and sensitive natural communities could potentially occur. All incidental observations of flora and fauna, including sign of wildlife presence (e.g., scat, tracks, burrows, vocalizations) were noted during the assessment. Photos within each project area were taken and are provided in **Appendix A** of this report.

2.3 Special-Status Species Habitat Assessment

The reconnaissance included a preliminary assessment of habitat for the special-status species that, based on available data, have known occurrences in the vicinity of the project sites. The CDFW CNDDB California Natural Diversity Data Base (CNDDB) (CDFW 2020) and CNPS Rare Plant Inventory (CNPS 2020) were queried prior to the reconnaissance to identify special-status plant and wildlife species that have been previously recorded in the region. The search area for these database queries included the Stevens United States Geological Survey (USGS) 7.5-minute quadrangle map in which the proposed project is located, as well as the surrounding eight USGS quadrangles: East Elk Hills, Tupman, Rosedale, Millux, Mouth of Kern, Taft, and Buttonwillow. In addition, the USFWS Environmental Conservation Online System was queried to assess whether the proposed project is located within or near designated critical habitat for listed species. These resources were used to establish a list of special-status species and sensitive natural plant communities that have been recorded in the area of the proposed project. Special-status species were also queried within a three-mile radius of the proposed project. During the reconnaissance, areas of suitable habitat was surveyed to determine if special-status species have a potential to occur within the area for the proposed project.

2.4 Jurisdictional Waters and Wetlands Investigation

A formal jurisdictional delineation was not conducted; however, an investigation of potential jurisdictional waters and wetlands was conducted via desktop and during reconnaissance to determine the location and size of the areas that could be defined as waters of the U.S. (WoUS), waters of the State (WoS), wetlands, or riparian habitat. Preliminary identification of potential jurisdictional areas within the project sites was based on a review of U.S. Geological Survey (USGS) 7.5-minute topographical maps, United States Department of Agriculture (USDA) Soil Survey Geographic Data Base and State Soil Geographic Data Base soil maps, National Wetlands Inventory data, Federal Emergency Management Agency (FEMA) flood zone data, and previous U.S. Army Corps of Engineers (USACE) jurisdictional determinations in the area. During the reconnaissance, the biologists visually estimated the structure and composition of onsite streambeds and vegetation in order to identify all areas potentially under USACE, Central Valley Regional Water Quality Control Board (RWQCB), or California Department of Fish and Wildlife (CDFW) jurisdiction. Active floodplains were identified using recent aerial photography and by identifying changes in the characteristics of vegetation and substrate composition. Several potential jurisdictional features were observed onsite and will be discussed in further detail in Section 4.4.

CHAPTER 3
Regulatory Framework

This section provides a summary of the federal, state, and local environmental regulations that govern the biological resources applicable to the study area. This section also provides a summary of other state and local environmental guidelines or listings that evaluate the rarity of species or the habitats they depend on.

3.1 Federal

Federal Endangered Species Act

The United States Congress passed the Federal Endangered Species Act (FESA) in 1973 to protect those species that are endangered or threatened with extinction. FESA is intended to operate in conjunction with the National Environmental Policy Act to help protect the ecosystems upon which endangered and threatened species depend. FESA prohibits the "take" of endangered or threatened wildlife species. "Take" is defined to include harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species or any attempt to engage in such conduct (FESA Section 3 [(3)(19)]). Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns (50 Code of Federal Regulations [CFR] Section 17.3). "Harass" is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns (50 CFR Section 17.3). Actions that result in take can result in civil or criminal penalties.

Migratory Bird Treaty Act

The MBTA generally prohibits the killing, possessing, or trading of migratory birds, bird parts, eggs, and nests, except as provided by the statute. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds. It further provides that it is unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (16 United States Code [USC] Section 703). As amended by U.S. Department of the Interior Solicitor's Opinion M-37050 in December 22, 2017 and subsequently by USFWS guidance issued on April 11, 2018, the accidental or incidental take of birds resulting from an activity is not prohibited by the MBTA when the underlying purpose is not to take birds. If the purpose of the action is not to take birds, Opinion M-37050 allows both the direct take of birds and their nests and indirect or incidental take that results in the direct loss of birds, nests, or eggs (USDOI 2017; USFWS 2018). Thus, the federal MBTA definition of "take" does not prohibit or penalize the incidental take of migratory birds that results from actions that are performed without

motivation to harm birds. This interpretation differs from the prior federal interpretation of "take", which prohibited all incidental take of migratory birds, whether intentional or incidental.

The MBTA, first enacted in 1916, prohibits any person, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention…for the protection of migratory birds…or any part, nest, or egg of any such bird" (16 U.S. Code 703).

Fish and Wildlife Conservation Act

The Fish and Wildlife Conservation Act declares that fish and wildlife are of ecological, educational, aesthetic, cultural, recreational, economic, and scientific value to the United States. The purposes of this Act are to encourage all federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities and to conserve and to promote conservation of non-game fish and wildlife and their habitats. Another purpose is to provide financial and technical assistance to the states for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife.

Clean Water Act

Section 404 and Wetlands

In accordance with Section 404 of the federal Clean Water Act (CWA), the USACE regulates discharge of dredged or fill material into waters of the United States. Waters of the United States and their lateral limits are defined in Title 33, Part 328.3(a) of the Code of Federal Regulations to include navigable waters of the United States, interstate waters, all other waters subject to the ebb and flow of the tide, and all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Waters of the United States are often categorized as "jurisdictional wetlands" (i.e., wetlands over which USACE exercises jurisdiction under Section 404) and "other waters of the United States" when habitat values and characteristics are being described. "Fill" is defined as any material that replaces any portion of a water of the United States with dry land or that changes the bottom elevation of any portion of a water of the United States. Any activity resulting in the placement of dredged or fill material within waters of the United States requires a permit from USACE.

Wetlands are a subset of "waters of the United States" and receive protection under Section 404 of the CWA. Wetlands are defined by the federal government as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR Section 328.3(c)(16)) . Waters of the U.S. do not include prior

converted cropland (33 CFR Section 328.3(b)(6)) . Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with U.S. Environmental Protection Agency (EPA) ((33 CFR Section 328.3(a)(8) added 58 FR 45035, August 25, 1993).

Section 401

Under Section 401 of the federal CWA, the Central Valley RWQCB must certify that actions receiving authorization under Section 404 of the CWA also meet state water quality standards.

3.2 State

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, waters of the state fall under the jurisdiction of the appropriate RWQCB. Under the act, the RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA. The RWQCB requires projects to avoid impacts to wetlands if feasible and requires that projects do not result in a net loss of wetland acreage or a net loss of wetland function and values. The RWQCB typically requires compensatory mitigation for impacts to wetlands and/or waters of the state. The RWQCB also has jurisdiction over waters deemed 'isolated' or not subject to Section 404 jurisdiction under *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (SWANCC). Dredging, filling, or excavation of isolated waters constitutes a discharge of waste to waters of the state and prospective dischargers are required obtain authorization through an Order of Waste Discharge or waiver thereof from the RWQCB and comply with other requirements of Porter-Cologne Act.

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, *CEQA Guidelines* Section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or animals. This section was included in the *CEQA Guidelines* primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on, for example, a candidate species that has not been listed by either USFWS or CDFW. Thus, CEQA provides an agency with the ability to protect a species from the potential impacts of a project until the respective government agencies have an opportunity to designate the species as protected, if warranted. CEQA also calls for the protection of other locally or regionally significant resources, including natural communities. Although natural communities do not at present have legal

protection of any kind, CEQA calls for an assessment of whether any such resources would be affected, and requires findings of significance if there would be substantial losses. Natural communities listed by CNDDB as sensitive are considered by CDFW to be significant resources and fall under the *CEQA Guidelines* for addressing impacts. Local planning documents such as general plans often identify these resources as well.

California Endangered Species Act (CESA)

Under CESA, the CDFW is responsible for maintaining a list of threatened and endangered species (California Fish and Game Code 2007), candidate species, and species of special concern. Pursuant to the requirements of CESA, an agency reviewing a project within its jurisdiction must determine whether any state listed endangered or threatened species may be present on the project region and determine whether the project would have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any project that may impact a candidate species. If there were project-related impacts to species on the CESA threatened and endangered list, they would be considered "significant." Impacts to "species of concern" would be considered "significant" under certain circumstances, discussed below.

California Fish and Game Code

Section 2080 - Threatened and Endangered Species

Section 2080 of the California Fish and Game Code states, "No person shall import into this state [California], export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the [California Fish and Game] commission determines to be an endangered species or threatened species, or attempt any of those acts, except as otherwise provided in this chapter, or the Native Plant Protection Act, or the California Desert Native Plants Act." Pursuant to Section 2081, CDFW may authorize individuals or public agencies to import, export, take, or possess, any state-listed endangered, threatened, or candidate species. These otherwise prohibited acts may be authorized through permits or Memoranda of Understanding if: (1) the take is incidental to an otherwise lawful activity; (2) impacts of the authorized take are minimized and fully mitigated; (3) the permit is consistent with any regulations adopted pursuant to any recovery plan for the species; and (4) the applicant ensures adequate funding to implement the measures required by CDFW. CDFW makes this determination based on available scientific information and considers the ability of the species to survive and reproduce.

Section 3503 – Nesting Birds and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of

nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

Section 1600 – Lake and Streambed Alteration

CDFW regulates activities that would interfere with the natural flow of, or substantially alter, a channel, bed, or bank of a lake, river, or stream. These activities are regulated under the California Fish and Game Code Sections 1600-1616. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying CDFW: substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. Requirements to protect the integrity of biological resources and water quality are often conditions of streambed alteration agreements. Requirements may include avoidance or minimization of the use of heavy equipment, limitations on work periods to avoid impacts on wildlife and fisheries resources, and measures to restore degraded sites or compensate for permanent habitat losses. A Streambed Alteration Agreement may be required by CDFW for construction activities that could result in an accidental release into a jurisdictional area.

A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Unlike the federal government, California has adopted the Cowardin, et al. (1979) definition of wetlands. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes (at least 50 percent of the aerial vegetative cover); (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Under normal circumstances, the federal definition of wetlands requires all three wetland identification parameters to be met, whereas the Cowardin definition requires the presence of at least one of these parameters. For this reason, identification of wetlands by state agencies consists of the union of all areas that are periodically inundated or saturated, or in which at least seasonal dominance by hydrophytes may be documented, or in which hydric soils are present.

Both state and federal wetland laws require that the biological and hydrological functions, which are lost when a wetland or water is altered or filled, be replaced as part of the respective permit processes. Compensatory actions include replacement of lost wetland acreage, usually in amounts substantially greater than the amount lost.

Sections 3511, 4700, 5050 and 5515 – Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species. CDFW is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. CDFW has informed nonfederal agencies and private parties that they must avoid take of any fully protected species in carrying out projects.

Native Plant Protection Act

The Native Plant Protection Act (California Fish and Game Code Sections 1900 et seq.) includes measures to preserve, protect, and enhance rare and endangered native plants. The list of native plants afforded protection pursuant to the Native Plant Protection Act includes those listed as rare and endangered under the CESA. The Native Plant Protection Act provides limitations on take as follows: "No person will import into this State, or take, possess, or sell within this State" any rare or endangered native plant, except in compliance with provisions of the act. Individual landowners are required to notify the CDFW at least 10 days in advance of changing land uses to allow the CDFW to salvage any rare or endangered native plant material.

3.3 Regional or Local

Kern County General Plan

This regulatory framework identifies the federal, state, and local statutes, ordinances, or policies that govern the conservation and protection of biological resources that must be considered by the County during the decision-making process for projects that have the potential to affect biological resources. The Kern County General Plan includes the following goals related to biological resources:

1.10.5 Threatened and Endangered Species

Policies

Policy 27: Threatened or endangered plant and wildlife species should be protected in accordance with State and federal laws.

Policy 28: County should work closely with State and federal agencies to assure that discretionary projects avoid or minimize impacts on fish, wildlife, and botanical resources.

Policy 29: County will seek cooperative efforts with local, State, and federal agencies to protect listed threatened and endangered plant and wildlife species through the use of conservation plans and other methods promoting management and conservation of habitat lands.

Policy 32: Riparian areas will be managed in accordance with the USACE and the CDFG rules and regulations to enhance the drainage, flood control, biological, recreational, and other beneficial uses while acknowledging existing land use patterns.

Implementation Measures

Q: Discretionary projects shall consider effects to biological resources as required by CEQA.

R: Consult and consider the comments from responsible and trustee wildlife agencies when reviewing a discretionary project subject to CEQA.

S: Pursue the development and implementation of conservation programs with State and federal wildlife agencies for property owners desiring streamlined endangered species mitigation programs.

Bakersfield General Plan

The project sites are also located within the area governed by the *Metropolitan Bakersfield General Plan* (City of Bakersfield and Kern County 2002). Within the Conservation Element Biological Resources Section of the Bakersfield General Plan, there are goals, policies, and an implementation measure that are applicable to the proposed project:

Goal 1: Conserve and enhance Bakersfield's biological resources in a manner which facilitates orderly development and reflect the sensitivities and constraints of these resources.

Goal 2: To conserve and enhance habitat areas for designated "sensitive" animal and plant species.

Policy 1: Direct development away from "sensitive biological resource" areas, unless effective mitigation can be implemented.

Policy 2: Preserve areas of riparian vegetation and wildlife habitat within floodways and along rivers and streams, in accordance with the Kern River Plan Element and channel maintenance programs designed to maintain flood flow discharge capacity.

Implementation 3: Preserve habitat and avoid "take" of protected species as required in the Metropolitan Bakersfield Habitat Conservation Plan.

Metropolitan Bakersfield Habitat Conservation Plan

The Metropolitan Bakersfield Habitat Conservation Plan (MBHCP) addresses the effect of urban growth on federally and State protected plant and animal species within the Metropolitan Bakersfield 2010 General Plan area. The MBHCP is a joint program of the City of Bakersfield and Kern County that was undertaken to assist urban development applicants in complying with State and federal endangered species laws. The MBHCP utilizes a mitigation fee paid by applicants for grading or building permits to fund the purchase and maintenance of habitat land to compensate for the effects of urban development on endangered species habitat. Approximately 60% of Phase 1 project site falls within the MBHCP area. However, the MBHCP finds that "commercial agricultural" activities are exempt from the requirements of the plan. Therefore, the proposed project would not be subject to MBHCP requirements.

Kern Water Bank Habitat Conservation Plan (HCP)/Natural Community Conservation Plan (NCCP)

The project sites are also located within the area governed by the Kern Water Bank HCP/NCCP. The Kern Water Bank HCP/NCCP goal is to accomplish both water conservation and environmental objectives. Only the Kern Water Bank Authority is authorized to implement covered activities within the HCP/NCCP area that may result in take of covered species (KWBA 1997). The HCP/NCCP area is within the conveyance facilities project site.

CHAPTER 4
Existing Conditions

The project sites are located in the San Joaquin Valley and in Kern County near the city of Bakersfield and the communities of Buttonwillow and Tupman. These areas are also located within the California Floristic Province (CA-FP), Great Central Valley Region, San Joaquin Valley (SnJV) Subregion (Hickman 1993). The CA-FP is the largest geographic unit in California and comprises much of the state west of the dry regions of the Great Basin (GB) and Desert (D) Provinces in northern and southern California (Hickman 1993). The Great Central Valley (GV) Region is entirely contained within the CA-FP, is roughly the same area as the California Central Valley, and was once comprised of grassland (California prairie), marshes, extensive riparian woodlands, and islands of valley-oak savanna, but is now predominantly agricultural (Hickman 1993). The GV Region is divided into two subregions: the Sacramento Valley (ScV) Subregion to the north and the SnJV Subregion to the south (Hickman 1993). The SnJV Subregion is the larger subregion and is hotter and drier than the ScV Subregion with desert elements in the south (Hickman, 1993). Land use within the vicinity of the proposed project is primarily agriculture.

Phase 1 Project Site

The Phase 1 project site consists of non-native grassland, agriculture fields, recharge basins, and areas where residential and business development has occurred. Residential and business developments are mainly in the far north-eastern portion of the Phase 1 project site. The recharge basins that currently exist within the Phase 1 project site consist of a mix of non-native and native vegetation species such as Russian thistle (*Kali tragus*, non-native), shortpod mustard (*Hirschfeldia incana*, non-native), annual burrweed (*Ambrosia acanthicarpa*, native), horseweed (*Erigeron canadensis*, native), and allscale saltbush (*Atriplex polycarpa*, native). The recharge basins are also intentionally planted with safflower (*Carthamus tinctorius*) and rye (*Secale cereal*) as "cover."

The recharge basins within the Phase 1 project site are separated by elevated roads with culverts installed underneath each road, allowing water to flow between the basins. Adjacent lands north and west of the property are comprised mainly of agricultural fields. The area east of the Phase 1 project site consists of residential neighborhoods, while the area to the south is owned by the Kern Water Bank (south of Stockdale Highway).

Phase 2 Project Site

The entire Phase 2 project site is currently used for agriculture, supporting crops such as alfalfa (*Medicago sativa*), cotton (*Gossypium* sp.), potato (*Solanum tuberosum*), grape (*Vitis* sp.), and pistachio (*Pistacia* sp.). Several small structures and open storage areas comprised of bare ground

have been developed for the operation and maintenance of the fields. One residential house and buildings associated with surrounding agricultural land uses occur to south of the site, along Stockdale Highway. The soft-bottomed East Side Canal directly abuts the eastern boundary and is regularly used to irrigate the nearby agricultural fields and orchards. The land south, north, east, and west of the Phase 2 project site is currently used for agricultural purposes.

Conveyance Facilities Project Site

The conveyance facilities project site consists of numerous vegetation communities; including but not limited to bush seepweed scrub, quailbrush scrub, smartweed-cocklebur patches, and spinescale scrub. Additionally, active agriculture lands exist on the western and northern portions of the site. Interstate 5 intersects diagonally through the site and is the east-west boundary that separates the site to the Phase 2 project site. Detailed descriptions of vegetation communities are described in Section 4.3, below.

The Tule Elk State Reserve is located within a section of the western and southern portion of the site. The Tule Elk State Reserve protects a small herd of tule elk (*Cervus canadensis nannodes*), which were once in danger of extinction in California. Some vegetation communities on the Tule Elk State Preserve include non-native grassland, annual grassland, and cattail marsh.

The Kern Water Bank is located on the eastern and southern portion of the site. Developed recharge basins were observed within this section of the site, as well as an access road that runs along the chain-link fence that separates from the Tule Elk State Reserve.

The northern portion of the site consists of mainly active agriculture lands interspersed with native vegetation communities such as bush seepweed scrub, annual grassland, allscale scrub, and quailbrush scrub. Additionally, a small area of urban development (gas station and other buildings), is located approximately in the central portion of the site.

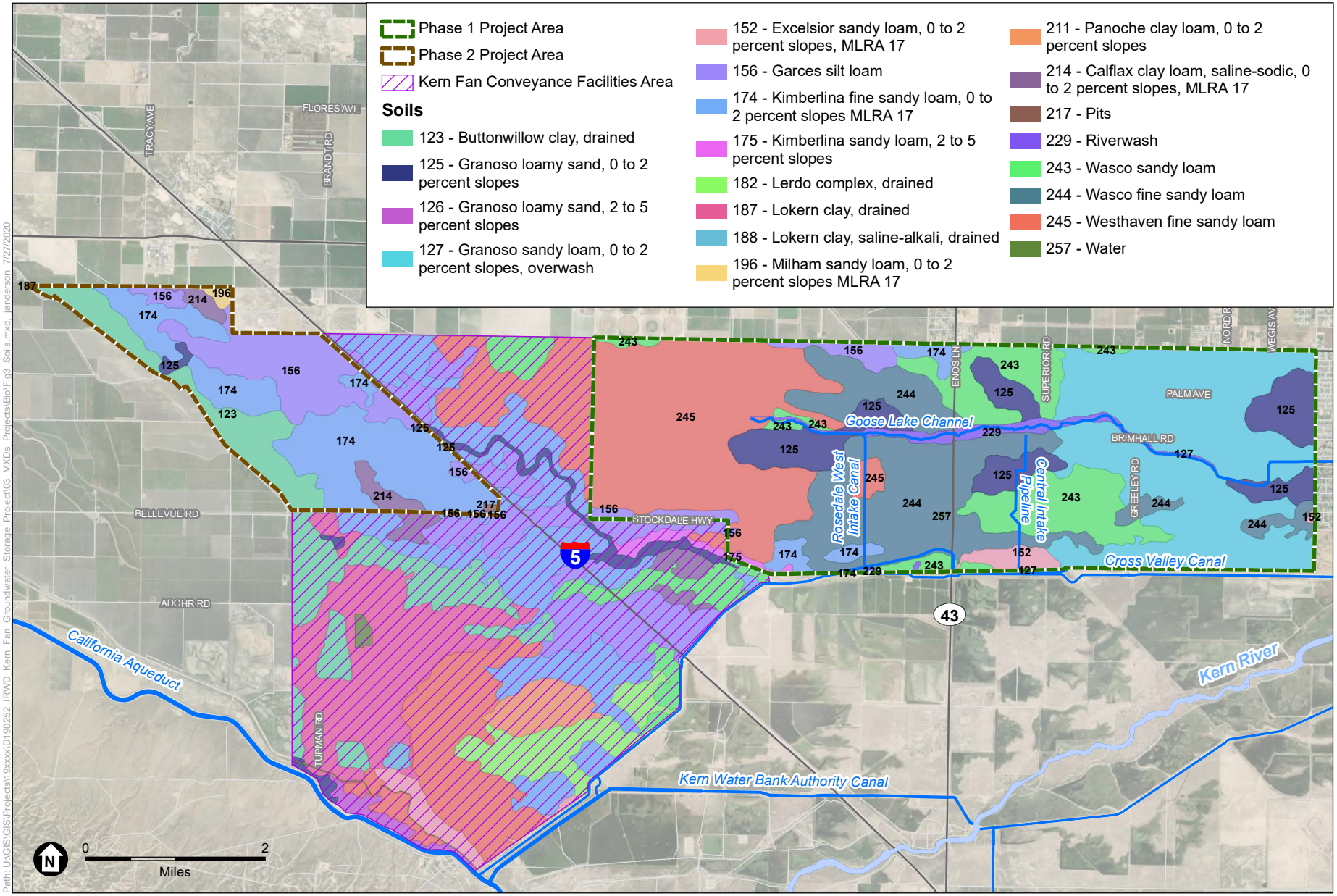
Two jurisdictional features are located on site, the East Side Canal and the Outlet Canal. These features are described in further detail in Section 4.4.

4.1 Climate

The climate of the proposed project is characterized by hot, dry summers with daytime temperatures frequently above 100 degrees Fahrenheit (NOAA 2020). The winter months are cool and foggy with temperatures seldom below freezing and, on average, there are between 250 and 300 frost-free days per year. Average rainfall is less than 10 inches per year with the heaviest rains occurring between January and March (NOAA 2020).

4.2 Soils and Topography

In general, the topography of the project sites is flat at approximately 310 feet above mean sea level (amsl). Soils on the project sites are deep to very deep, well drained, with slow to moderately rapid permeability (NRCS 2020). Descriptions of the 19 soil types found are discussed below and depicted on **Figure 3**.



SOURCE: ESRI; Kern County; USDA, 2020

Kern Fan Groundwater Storage Project

Figure 3
Soils

ESA

Buttonwillow clay, drained

The Buttonwillow clay, drained soil consists of deep, somewhat poorly drained soils formed in alluvium weathered mainly from granite. Buttonwillow soils are in basins and have slopes of 0 to 2 percent. The mean annual precipitation is approximately 5 inches and the mean annual temperature is 63 degrees F.

Granoso loamy sand, 0 to 2 percent slopes and Granoso loamy sand, 0 to 2 percent slopes, overwash, Granoso loamy sand, 2 to 5 percent slopes

The Granoso series consists of very deep, somewhat excessively drained soils that formed in alluvium derived from rocks of mixed mineralogy. The Granoso soils are on alluvial fans and flood plains and have slopes of 0 to 5 percent. The average annual precipitation is approximately 6 inches and the mean annual temperature is about approximately 64 degrees F.

Excelsior sandy loam, 0 to 2 percent slopes, MLRA 17

The Excelsior series consists of very deep, well drained soils on alluvial fans, bars and channels on flood plains. These soils are formed in mixed alluvium dominantly from igneous and calcareous sedimentary rocks. The slope is 0 to 2 percent, mean annual temperature is approximately 63 degrees F. and the mean annual precipitation is approximately 7 inches.

Garces silt loam

The Garces series consists of very deep, well drained saline-sodic soils that formed in granitic alluvium. Garces soils are on alluvial fans, terraces, and basin rims and have slopes of 0 to 2 percent. The mean annual precipitation is approximately 6 inches and the mean annual temperature is approximately 64 degrees F.

Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 and Kimberlina sandy loam, 2 to 5 percent slopes

The Kimberlina series consists of very deep, well drained soils on flood plains and recent alluvial fans. These soils are formed in mixed alluvium derived dominantly from igneous and/or sedimentary rock sources. The slope is 0 to 9 percent, mean annual precipitation is approximately 6 inches and the mean annual temperature is approximately about 64 degrees F.

Lerdo complex, drained

The Lerdo series consists of deep, somewhat poorly drained soils formed in granitic or sedimentary alluvium. Lerdo soils are located on alluvial plains and saline-alkali basins and have slopes of 0 to 2 percent. The mean annual precipitation is approximately 5 inches and the mean annual temperature is approximately 64 degrees F.

Lokern clay, drained, Lokern clay, saline-alkali drained

The Lokern series consists of deep, somewhat poorly drained clayey soils formed from mixed but predominantly granitic alluvium. Lokern soils are located on basins and have slopes of 0 to 2 percent. The mean annual precipitation is approximately 5 inches and the mean annual temperature is approximately 63 degrees F.

Milham sandy loam, 0 to 2 percent slopes MLRA 17

The Milham series consists of very deep, well drained soils on alluvial fans, plains, low terraces and fan remnants. These soils formed in mixed calcareous alluvium weathered from granitic and sedimentary rock. The slope is 0 to 9 percent, average annual precipitation is approximately 7 inches and the mean annual temperature is approximately 64 degrees F.

Panoche clay loam, 0 to 2 percent slopes

The Panoche series consists of very deep, well drained soils on alluvial fans and flood plains. These soils formed in loamy calcareous alluvium from sedimentary rock and slope is 0 to 15 percent. The mean annual precipitation is approximately 6 inches and the mean annual temperature is approximately 63 degrees F.

Calflax clay loam, saline-sodic, 0 to 2 percent slopes, MLRA 17

The Calflax series consists of very deep, moderately well drained soils on fan skirts These soils are formed in alluvium derived from calcareous sedimentary rock. The slope is 0 to 2 percent, mean. The mean annual precipitation is about 7 inches and the mean annual temperature is about 63 degrees F.

Pits

These soils consist of areas that have been excavated for sand or gravel. The areas are mostly on broad outwash plains and terraces of stream valleys and generally range from 3 to 30 acres. These areas have sparse vegetation consisting of drought-resistant plants. Slopes range mostly from 0 to 25 percent and steep escarpments are along the edges of the pits.

Riverwash

This soil is found on barren alluvial areas, usually coarse-textured, exposed along streams at low water and subject to shifting during normal high water.

Wasco sandy loam and Wasco fine sandy loam

The Wasco series consists of very deep, well drained soils on recent alluvial fans and flood plains. These soils formed in mixed alluvium derived mainly from igneous and/or sedimentary rock sources. The slope is 0 to 5 percent slopes, mean annual precipitation is approximately 6 inches and the mean annual temperature is approximately 64 degrees F.

Westhaven fine sandy loam

The Westhaven series consists of very deep, well drained soils that formed in stratified mixed alluvium weathered from sedimentary and/or igneous rocks. Westhaven soils are on alluvial fans and flood plains. The slope is 0 to 5 percent, mean approximately precipitation is about 7 inches and the mean annual temperature is approximately 64 degrees F.

4.3 Vegetation Communities and Land Cover Types

All vegetation communities and land cover types were characterized and delineated on aerial photographs during the field survey, and then digitized on aerial maps using a Geographic Information System software (ArcGIS). The nomenclature used to describe the vegetation is based on *A Manual of California Vegetation*, Second Edition (Sawyer 2009), or characterized based on species dominance when not recognized in the *Manual*. Vegetation communities and land cover types located on the project sites are described in detail below and are depicted on **Figure 4**. It should be noted that the majority of the conveyance facilities project site is located on private property and biologists were unable to access to map vegetation communities and land cover types. The entire conveyance facilities project site was previously mapped and provided on a dataset by the Geographical Information Center at California State University, Chico (CSU Chico 2018). The entirety of these communities cannot be described at this time, as access was not allowed; however, the vegetation community classification locations and acreages are listed below.

Vegetation Communities

Non-Native Grassland

This vegetation community was characterized and mapped in several areas within the Phase 1 and within the eastern and western areas of the conveyance facilities site. The areas adjacent to this community comprise of private residences, recharge basins, roadways, agricultural fields and saltscale scrub. Species observed within this community included Russian thistle and shortpod mustard. This vegetation community consists approximately 2,434.60 acres.

Annual Grassland – Alkali Desert Scrub

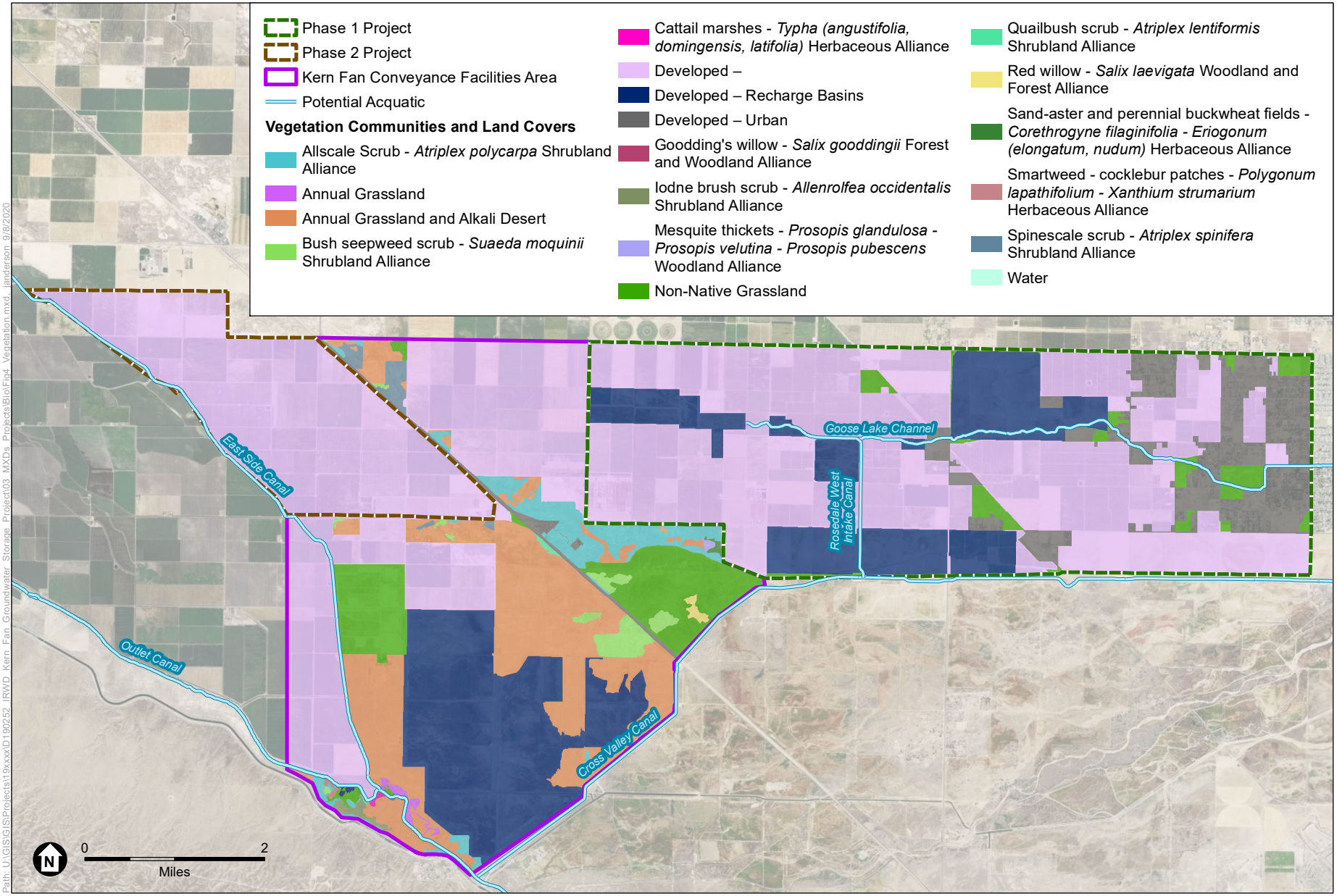
This vegetation community is located in numerous areas, mainly in central and western portions of the conveyance facilities site, and comprises collectively of approximately 2,771acres.

Annual Grassland Scrub

This vegetation community is located in the southern portion of the conveyance facilities site and comprises collectively of approximately 44 acres.

Allscale Scrub – *Atriplex polycarpa* Shrubland Alliance

This vegetation community is located almost exclusively in the central portion of the of the conveyance facilities site and comprises collectively of approximately 662 acres.



SOURCE: ESRI; Kern County; CDFW; ESA.

Kern Fan Groundwater Storage Project

Figure 4

Vegetation Communities and Land Covers

ESA

Spinescale scrub – Atriplex spinifera Shrubland Alliance

This vegetation community is located almost exclusively in the northern portion of the of the conveyance facilities site and comprises collectively of approximately 115 acres. Additionally, several small patches are located in the middle portion of the conveyance facilities site.

Iodine brush scrub – *Allenrolfea occidentalis* Shrubland Alliance

This vegetation community is located in the southeastern portion of the conveyance facilities site and comprises collectively of approximately 39 acres. This community is considered sensitive with a State ranking of S3.2.

Sand-aster and perennial buckwheat fields - *Corethrogyne filaginifolia – Eriogonum (elongatum, nudum*) Herbaceous Alliance

This vegetation community is located within the northern portion of the conveyance facilities site and comprises collectively of approximately 10 acres.

Bush seepweed scrub – *Suaeda moquinii* Shrubland Alliance

This vegetation community is located primarily within the eastern portion of the conveyance facilities site, with a couple small patches located in the northern porton. This community comprises collectively of approximately 220 acres and is considered sensitive with a State ranking of S3.

Smartweed – cocklebur patches – *Polygonum lapathifolium – Xanthium strumarium* Herbaceous Alliance

This vegetation community is located within the southwestern portion of the conveyance facilities site and comprises collectively of approximately 8 acres.

Quailbush scrub – *Atriplex lentiformis* Shrubland Alliance

This vegetation community is located within the northern portion of the conveyance facilities site and comprises collectively of approximately 15 acres.

Goodding's willow - *Salix gooddingii* Forest & Woodland Alliance

This vegetation community is located within southwestern portion of the conveyance facilities site and comprises collectively of approximately 7 acres. This community is considered sensitive with a State ranking of S3.

Red willow – *Salix laevigata* Woodland and Forest Alliance

This vegetation community is located in a small area of the western portion of the conveyance facilities site and comprises collectively of approximately 23 acres. This community is considered sensitive with a State ranking of S3.

Cattail marshes – *Typha* (*angustifolia, domingensis, latifolia*) Herbaceous Alliance

This vegetation community is located in the southwestern portion of the conveyance facilities site and comprises collectively of approximately 5 acres.

Mesquite thickets – Prosopis glandulosa – Prosopis velutina – Prosopis pubescens Woodland Alliance

This vegetation community is located in a small patch in the western portion of the conveyance facilities site and comprises collectively of approximately 5 acres. This community is considered sensitive with a State ranking of S3.

Land Cover Types

Developed – Agriculture

The majority of the Phase 1 project site and entire Phase 2 project site consists of this land cover type. The agricultural land supports orchards and row crops. Crops found within this land cover type include alfalfa, cotton, potato, grape, and pistachio divided by dirt access roads. Additionally, much of the conveyance facilities project site consists of this land cover type, located in the northern and western portions.

Several small areas of bare ground occur along the edges of the access roads where equipment and materials are stored. This land cover type consists approximately 15,375 acres.

Developed – Urban

Several areas within the Phase 1 project site, mainly the eastern portion of the site, contain this land cover type that consists of private residences, businesses, storage yards, and buildings. A small area within the central portion of the conveyance facilities site consists of this land cover type. This land cover type consists approximately 1,905 acres.

Developed – Recharge Basins

Numerous recharge basins reside within the Phase 1 and conveyance facilities project sites. These recharge basins have been converted from previously used agricultural fields. Raised access roads run between the basins with large culverts under each road to connect the basins. As previously discussed, the recharge basins consist of a mix of non-native and native vegetation species such as Russian thistle, shortpod mustard, annual burrweed, horseweed, and allscale saltbush. The recharge basins are also intentionally planted with safflower and rye. This land cover type consists approximately 5,015 acres.

Open Water

The Outlet Canal runs through a small southwestern portion of the conveyance facilities project site and totals approximately 14 acres.

4.4 Aquatic Resources

A formal wetland/jurisdiction delineation was not conducted at the time of the reconnaissance; however, several aquatic resources are located within and immediately adjacent to the project sites could potentially be subject to the regulatory authority of the USACE, CDFW, and/or RWQCB (Figure 4). These jurisdictional features are described below.

Rosedale West Intake Canal

The Rosedale West Intake Canal is a manmade, soft-bottomed channel that pulls water from the California Aqueduct to irrigate the adjacent agriculture fields and recharge basins. The canal lies in a north-south direction and connects with the Goose Lake Channel to the north and the California Aqueduct to the south.

Goose Lake Channel

Goose Lake Channel is a natural, soft bottom channel comprised of dirt and sandy soils dominated by weedy plant species, such as Russian thistle and shortpod mustard. In the western portion of the channel, a small area of bulrush (*Scirpus* sp.) exists within the channel. The eastern portion of Goose Lake Channel, within Phase 1 project site has several Fremont's cottonwood (*Populus fremontii*) interspersed on the south side of the channel. The channel is gravity fed from the Kern River (when water is present) and flows from east to west and eventually settles into a small pond in the western portion of Phase 1. At the time of the reconnaissance, no water was present within Goose Lake Channel. Goose Lake Channel is considered a wildlife corridor, which will be described in more detail in Section 4.8.

East Side Canal

The East Side Canal is a soft-bottomed irrigation canal that originates from a common diversion at Manor Street in Bakersfield. From the common diversion, the canal travels south, where it ties in with the Outlet Canal, located on the Tule Elk State Reserve. The East Side Canal also abuts to the western boundary of the Phase 2 project site.

Outlet Canal

A portion of the Outlet Canal is located in the southwestern portion of the conveyance facilities site, within the Tule Elk State Reserve. At the time of the reconnaissance, the biologists were unable to distinguish features (vegetation species and if water was present) due to access restrictions.

Cross Valley Canal (off-site)

The CVC is a paved canal with consistent, year-round flow that is located just south of the southern boundary of Phase 1 project site. The water in the CVC feeds the adjacent recharge basins.

4.5 Sensitive Natural Communities

Sensitive natural communities are listed by CDFW on their List of Vegetation Alliances and Associations (CDFG 2010). Communities on this list are given a Global (G) and State (S) rarity ranking on a scale of 1 to 5, where communities with a ranking of 5 are the most common and communities with a ranking of 1 are the rarest and of the highest priority to preserve. For the purpose of this report, Sensitive natural communities are those communities that have a state ranking of S3 or rarer, and are generally those that are considered by the CDFW to be imperiled due to their decline in the region and/or the habitat they provide to rare and endemic wildlife species. Continued degradation and destruction of these ecologically important communities could threaten the regional distribution and viability of the community and possibly the sensitive species they support.

A review of the most recent CNDDB records revealed five sensitive natural communities have been recorded in the vicinity of the proposed project that include Great Valley Cottonwood Riparian Forest, Great Valley Mesquite Scrub, Valley Sacaton Grassland, Valley Saltbush, and Valley Sink Scrub; however, none of these communities occur within the project sites.

After reviewing the vegetation communities mapped by California State University, Chico (described in Section 4.3 above), there are five native vegetation communities that are considered sensitive within the conveyance facilities project site, including: Bush seepweed scrub - *Suaeda moquinii* Shrubland Alliance, Goodding's willow - *Salix gooddingii* Forest & Woodland Alliance, Red willow - *Salix laevigata* Woodland and Forest Alliance, Iodine brush scrub - *Allenrolfea occidentalis* Shrubland Alliance, and Mesquite thickets - *Prosopis glandulosa - Prosopis velutina - Prosopis pubescens* Woodland Alliance, all with an S3 ranking.

4.6 Special-Status Plants

Special-status plants are defined as those plants that, because of their recognized rarity or vulnerability to various causes of habitat loss or population decline, are recognized by federal, state, or other agencies as under threat from human-associated developments. Some of these species receive specific protection that is defined by federal or state endangered species legislation. Others have been designated as special-status on the basis of adopted policies and expertise of state resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. Special-status plants are defined as follows:

- Plants listed or proposed for listing as threatened or endangered, or are candidates for possible future listing as threatened or endangered, under the federal Endangered Species Act or the California Endangered Species Act;
- Plants that meet the definitions of rare or endangered under State CEQA Guidelines Section 15380;
- Plants considered by the California Native Plant Society (CNPS) to be rare, threatened, or endangered (Rank 1A, 1B, 2A and 2B plants) in California;

- Plants listed by the CNPS as plants in which more information is needed to determine their status and plants of limited distribution (List 3 and 4 plants); and
- Plants listed as rare under the California Native Plant Protection Act (Fish and Game Code 1900 et seq.)

A review of the CNDDB (CDFW 2020) and the CNPS Inventory of Rare and Endangered Plants (CNPS 2020) revealed a total of 23 special-status plant species recorded within the nine USGS quadrangles that were searched. The potential for special-status plant species to occur on the project sites is based on vegetation and habitat quality, topography, elevation, soils, surrounding land uses, habitat preferences, geographic ranges and visual observations made during the focused sensitive plant surveys. The 23 special-status plant species listed in **Table 1** below were determined to have varying levels of potential to occur within the project sites based on the following criteria:

- **Unlikely:** The project sites and/or immediate area do not support suitable habitat for a particular species, and therefore the proposed project is unlikely to impact this species.
- **Low Potential:** The project sites only provides limited habitat for a particular species. In addition, the known range for a particular species may be outside of the survey area.
- **Medium Potential:** The project sites provide marginal habitat for a particular species.
- **High Potential:** The project sites provide suitable habitat conditions for a particular species and/or known populations occur in the immediate area.
- **Present**: The species has been observed or previously recorded (within the last 10 years) within the project sites.

Special-status plant species with records of occurrences in the region from the CNDDB are listed below in **Table 1 Special-Status Plant Species**.

TABLE 1
SPECIAL-STATUS PLANT SPECIES POTENTIAL TO OCCUR WITHIN PROJECT SITES

Common Name	Scientific Name	Status (Federal/State/CNPS)	Habitat	Potential to Occur
Plants				
Horn's milk vetch	*Astragalus hornii var. hornii*	--/--/1B.1	Meadows and seeps, Playas/lake margins in alkaline soils.	**Unlikely**. Suitable habitat for this species is not present on the project sites.
heartscale	*Atriplex cordulata var. cordulata*	--/--/1B.2	Chenopod scrub, Meadows and seeps, Valley and foothill grassland in sandy/saline or alkaline soils.	**Low**. Suitable soils for this species exist on portions of the project sites but the habitat on site is marginal at best.
Earlimart orache	*Atriplex cordulata var. erecticaulis*	--/--/1B.2	Valley and foothill grassland	**Low.** Suitable soils for this species exist on portions of the project sites but the habitat on site is marginal at best.

Common Name	Scientific Name	Status (Federal/State/CNPS)	Habitat	Potential to Occur
Crownscale	*Atriplex coronata var. coronata*	--/--/4.2	Alkaline and clay soils. Chenopod scrub, valley and foothill grassland, and vernal pools	**Low**. Suitable habitat for this species occurs in the non-native grassland within project sites but is marginal at best.
Lost hills crownscale	*Atriplex coronata var. vallicola*	--/--/1B.2	Chenopod scrub, Valley and foothill grassland, Vernal pools in alkaline soils.	**Low**. Suitable habitat for this species occurs in the non-native grassland within project sites but is marginal at best.
Lesser saltscale	*Atriplex minuscula*	--/--1B.1	Chenopod scrub, Playas, Valley and foothill grassland in alkaline or sandy soils.	**Low**. Suitable habitat for this species occurs in the non-native grassland within project sites but is marginal at best.
Subtle orache	*Atriplex subtilis*	--/--/1B.2	Valley and foothill grassland.	**Medium**. Suitable habitat for this species occurs within the conveyance facilities project site.
Mexican mosquito fern	*Azolla microphylla*	--/--/4.2	Marshes and swamps	**Unlikely**. Habitat requirements are not present on site.
Alkali mariposa lily	*Calochortus striatus*	--/--/1B.2	Chaparral, Chenopod scrub, Mojavean desert scrub, Meadows and seeps in alkaline/ mesic soils.	**Unlikely**. Habitat requirements are not present on project sites.
California jewelflower	*Caulanthus californicus*	FE/CE/1B.1	Sandy soils, chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland	**Medium**. Suitable habitat for this species occurs within conveyance facilities project site.
Slough thistle	*Cirsium crassicaule*	--/--/1B.1	Chenopod scrub, Marshes and swamps (sloughs), and Riparian scrub.	**Medium.** Suitable habitat occurs within conveyance facilities project site.
Recurved larkspur	*Delphinium recurvatum*	--/--/1B.2	Chenopod scrub, Cismontane woodland, and Valley and foothill grassland in alkaline soils.	**Medium**. Suitable habitat for this species occurs in annual grassland within conveyance facilities project site.
Kern mallow	*Eremalche kernensis*	FE/--	Chenopod scrub and Valley and foothill grassland.	**Medium.** Species has been observed within Phase 1 project site; however, occurrences are very old and site is completely disturbed (agriculture fields) where occurrences were documented. Suitable habitat exists within conveyance facilities project site.

Common Name	Scientific Name	Status (Federal/State/CNPS)	Habitat	Potential to Occur
Hoover's eriastrum	*Eriastrum hooveri*	--/--/4.2	Gravelly soils supporting Chenopod scrub, Pinyon and juniper woodland, and Valley and foothill grassland.	**Medium.** Species has been observed within Phase 1 project site; however, occurrences are very old and site is completely disturbed (agriculture fields) where occurrences were documented. Suitable habitat occurs within conveyance facilities project site.
Cottony buckwheat	*Eriogonum gossypinum*	--/--/4.2	Clay soils. Chenopod scrub and valley and foothill grassland.	**Unlikely**. Habitat requirements are not present on project sites.
Tejon poppy	*Eschscholzia lemmonii ssp. kernensis*	--/--/1B.1	Chenopod scrub and Valley and foothill grassland.	**Low**. Suitable habitat for this species occurs in the non-native grassland within project sites but is marginal at best.
Golden goodmania	*Goodmania luteola*	--/--/4.2	Alkaline or clay soils. Mojavean desert scrub, meadows and seeps, playas, and valley and foothill grassland.	**Unlikely**. Habitat requirements are not present on project sites.
Vernal barley	*Hordeum intercedens*	--/--/3.2	Coastal dunes, coastal scrub, valley and foothill grassland (saline flats and depressions), and vernal pools.	**Unlikely**. Habitat requirements not present on project sites.
Coulter's goldfields	*Lasthenia glabrata ssp. coulteri*	--/--/1B.1	Marshes and swamps (coastal salt), Playas, and Vernal pools.	**Unlikely.** Habitat requirements not present on project sites.
San Joaquin woolythreads	*Monolopia congdonii*	FE/--/1B.2	Chenopod scrub and Valley and foothill grassland in sandy soils.	**Medium.** Suitable habitat for this species occurs within conveyance facilities project site.
Oil neststraw	*Stylocline citroleum*	--/--/1B.1	Chenopod scrub, Coastal scrub, valley and Foothill grassland in clay soils.	**Low**. Suitable habitat for this species occurs in the non-native grassland within project sites but is marginal at best.
Mason's neststraw	*Stylocline masonii*	--/--/1B.1	Chenopod scrub and pinyon and juniper woodland	**Low**. Suitable habitat for this species occurs in the non-native grassland within project sites but is marginal at best.
San Joaquin bluecurls	*Trichostema ovatum*	--/--/4.2	Chenopod scrub and valley and foothill grassland	**Low**. Suitable habitat for this species occurs in the non-native grassland within project sites.

Key:

Status (Federal/State): FE-federally endangered; SE-state endangered

Status (CNPS): List 1B = Plants Rare, Threatened, endangered in California and elsewhere, List 2 = Plants Rare, Threatened, or, Endangered in California, But More Common Elsewhere, List 4 = Plants of Limited Distribution - A Watch List. Threat ranks .1 = seriously Endangered in California, .2 = fairly Endangered in California, .3 = Not very threatened in California (low degree/immediacy of threats or no current threats known).

4.7 Wildlife

Numerous wildlife species were observed during the reconnaissance that are common to the region. Nomenclature for wildlife species observed or expected to occur within the project sites follow Jameson & Peeters (2004) for mammals, Jennings & Hayes (1994) and Stebbins (1985) for amphibians and reptiles, and Sibley (2013) for birds.

Avian species observed included killdeer (*Charadrius vociferous*), house finch (*Haemorhous mexicanus*), song sparrow (*Melospiza melodia*), Eurasian collared dove (*Streptopelia dec*aocto), California scrub jay (*Aphelocoma californica*), brown-headed cowbird (*Molothrus ater*), red-tailed hawk (*Buteo jamaicensis*), common raven (*Corvus corax*), western kingbird (*Tyrannus verticalis*), northern mockingbird (*Mimus polyglottos*), greater yellow legs (*Tringa melanoleuca*), great egret (*Ardea alb*a), great blue heron (*Ardea Herodias*), and cliff swallow (*Petrochelidon pyrrhonota*). Mammal species observed included desert cottontail (*Sylvilagus audubonii*), California ground squirrel (*Otospermophilus beecheyi*), coyote (*Canis latrans*), and tule elk (*Cervus canadensis nannodes*). One reptile species was observed, western fence lizard (*Sceloporus occidentalis*). No amphibians were observed.

Three special-status wildlife species were observed during the reconnaissance. Two separate Swainson's hawks (*Buteo swainsoni*) were observed flying overhead the Phase 2 project site. One California horned lark (*Eremophila alpestris actia*) was heard vocalizing within the interior orchards of Phase 2 project site. One deceased American badger (*Taxidea taxus*) was observed along the southern boundary of the Phase 1 project site. The badger was most likely struck by a passing vehicle on Stockdale Highway, south of the southern boundary.

Numerous other common wildlife species are expected to forage and/or breed within the habitats that occur within the Phase 1 and Phase 2 project sites that include, but not limited to, deer mice (*Peromyscus* sp,), side-blotched lizard (*Uta* sp.), and red-shouldered hawk (*Buteo lineatus*).

4.8 Special-Status Wildlife

Special-status wildlife species are defined as those animals that, because of their recognized rarity or vulnerability to various forms of habitat loss or population decline, are recognized by federal, state, or other agencies as under threat from human-associated developments. Some of these species receive specific protection that is defined by federal or state endangered species legislation. Others have been designated as special-status on the basis of adopted policies and expertise of state resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. Special-status wildlife species evaluated in this BRTR include:

- Wildlife listed or proposed for listing as threatened or endangered, or are candidates for possible future listing as threatened or endangered, under the federal Endangered Species Act or the California Endangered Species Act;
- Wildlife that meet the definitions of rare or endangered under State CEQA Guidelines Section 15380.

- Wildlife covered under an adopted NCCP/HCP;
- Wildlife designated by CDFW as species of special concern, included on the Watch List or are considered Special Animals;
- Wildlife "fully protected" in California (Fish and Game Code Sections 3511, 4700, and 5050); and
- Avian species protected by the MBTA

A review of the most recent CNDDB (CDFW, 2020) records for the project sites revealed 32 special-status wildlife species previously recorded within the project sites. The 32 special-status wildlife species listed in **Table 2** below were determined to have varying levels of potential to occur within the project sites based on the following criteria:

- **Unlikely:** The project sites and/or immediate area do not support suitable habitat for a particular species, and therefore the proposed project is unlikely to impact this species.
- **Low Potential:** The project sites only provides limited habitat for a particular species. In addition, the known range for a particular species may be outside of the survey area.
- **Medium Potential:** The project sites provide marginal habitat for a particular species.
- **High Potential:** The project sites provide suitable habitat conditions for a particular species and/or known populations occur in the immediate area.
- **Present**: The species has been observed or previously recorded (within the last 10 years) within the project sites.

Special-status wildlife species with records of occurrences in the region from the CNDDB are listed below in **Table 2 Special-Status Wildlife Species**. Records of special-status wildlife species detected within three miles of the project sites are depicted on **Figure 5**, while special-status wildlife species detected during the reconnaissance are depicted on **Figure 6**.

TABLE 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES WITHIN PROJECT SITES

Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
Birds				
tricolored blackbird	*Agelaius tricolor*	--/ST	Tricolored blackbirds have three basic requirements for selecting their breeding colony sites: open, accessible water; a protected nesting substrate, including flooded, thorny, or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony.	**Medium**. The open water canals on and adjacent to the Phase 1 and Phase 2 project sites can support this species. Species has been previously observed within Phase 1 and adjacent to Phase 2 project sites, where the species could potentially nest in the water canals.

Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
burrowing owl	*Athene cunicularia*	--/SSC	Found in open, dry grasslands, agricultural and range lands, and desert habitats often associated with burrowing animals, particularly prairie dogs, ground squirrels and badgers.	**High**. The non-native grasslands present within Phase 1 project site contains suitable habitat. Species has been observed to the north and northeast of Phase 1 project site.
Swainson's hawk	*Buteo swainsoni*	--/ST	Forages in a wide variety of open habitats, ranging from prairie and shrublands to desert and intensive agricultural systems. Within California, the species is strongly associated with riparian areas within desert, shrubsteppe, grassland, and agricultural habitats.	**Present**. Two adults were observed flying overheard the Phase 2 project site. The project sites contain suitable nesting habitat.
western snowy plover (inland)	*Charadrius alexandrines nivosus*	--/SSC	Nests and forages near playas and inland lakes.	**Unlikely.** The species is believed to be extirpated from the region. The species' only occurrence record in the vicinity of the project sites was recorded in 1912 (ESA 2013).
mountain plover	*Charadrius montanus*	--/SSC	Favored habitats include prairie dog towns, areas heavily grazed by domestic livestock or wild herbivores, bare ground areas near artificial watering structures, recently burned or mowed areas, and recently fallowed or tilled crop fields. Found in grasslands, freshly plowed and newly sprouting grain fields, and sod farms. Prefers grazed areas and areas with burrowing rodents.	**Low.** The project sites provide suitable habitat for the species; however, the only occurrence for the species was within the conveyance facilities project site in 1990.
western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/SE	Prefers open woodlands with clearings and a dense shrub layer. They are often found in woodlands near streams, rivers or lakes.	**Unlikely**. Habitat requirements not present on project sites.
fulvous whistling-duck	*Dendrocygna bicolor*	--/SSC	Rice fields, swamplands, marshes with lots of reeds and swamp vegetation.	**Unlikely**. Habitat requirements not present on project sites.
white-tailed kite	*Elanus leucurus*	--/FP	Found in rolling foothills, and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodlands. Foraging habitat includes open grasslands, meadows, or marshes close to dense topped trees for nesting and perching	**Low**. Habitat requirements not present on site. One detection was made approximately half-mile south of Phase 1 project site in 1992.
California horned lark	*Eremophila alpestris actia*	--/WL	Species frequents open ground, farmland, prairies, and deserts.	**Present**. A single adult was heard vocalizing within Phase 2 project site.
white-faced ibis (nesting colony)	*Plegadis chihi*	--/WL	Frequents marshes, swamps, ponds and rivers.	**Unlikely**. Nesting habitat requirements not present on project site. Likely to occur foraging as this species utilizes agricultural fields such as alfalfa for foraging.

Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
Le Conte's thrasher	*Toxostoma lecontei*	--/SSC	Generally, found in open desert scrub, alkali desert scrub, and desert succulent scrub. In the San Joaquin Valley, the species is found primarily in habitats dominated by saltbush, and often frequents desert washes and flats with scattered saltbush.	**Low.** The species may occur in the vicinity of the project sites, but is unlikely to occur within the project sites due to the low quality and minimal availability of suitable habitat.
least Bell's vireo	*Vireo belli pusillus*	FE/SE	Dense, low, shrubby vegetation, generally early successional stages in riparian areas, brushy fields, woodland, scrub oak, coastal chaparral, and often near water in arid regions.	**Unlikely**. Habitat requirements not present on project sites.
Mammals				
Nelson's antelope squirrel	*Ammospermophilus nelsoni*	--/FT	In the southern and western San Joaquin Valley, San Joaquin antelope squirrels are associated with open, gently sloping land with shrubs. Typical vegetation includes saltbushes and *Ephedra* sp. and sparsely vegetated, loamy soils.	**Medium**. Several CNDDB detections have been made within or adjacent to the project sites.
giant kangaroo rat	*Dipodomys ingens*	FT/ST	Prefer annual grassland on gentle slopes of generally less than 10 degrees, with friable, sandy-loam soils in the San Joaquin Valley.	**Low.** The species may occur in the vicinity of the project, but is unlikely to occur within Phase 1 and Phase 2 project sites. The non-native grassland within Phase 1 project site provides minimal suitable habitat for the species. There has been one record of the species located approximately three miles southwest of Phase 2 project site in 1990.
short-nosed kangaroo rat	*Dipodomys nitratoides brevinasus*	--/SSC	Found in the western San Joaquin Valley; mostly on flat and gently sloping terrain and on hilltops in desert-shrub associations, primarily saltbushes and California ephedra.	**Low.** The species may occur in the vicinity of the project, but is unlikely to occur within Phase 1 and Phase 2. The non-native grassland within Phase 1 project site provides minimal suitable habitat for the species. There has been one records of the species; located approximately three miles southwest of Phase 2.
Tipton kangaroo rat	*Dipodomys nitratoides nitratiodes*	FE/SE	Limited to arid-land communities occupying the Valley floor of the Tulare Basin of the San Joaquin Valley, on level or nearly level terrain.	**Medium**. Habitat exists on Phase 1 and Phase 2 project sites and species has been detected twice (1990 and 2002) within Phase 1. Additionally, numerous detections have been made within three miles.

Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
western mastiff bat	*Eumops perotis californicus*	--/SSC	Found in open, semi-arid to arid habitats including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	**Unlikely**. Habitat requirements not present on project sites.
Tulare grasshopper mouse	*Onychomys torridus tularensis*	--/SSC	Tulare grasshopper mice typically inhabit arid shrubland communities in hot, arid grassland and shrubland associations.	**Low.** The species may occur in the vicinity of the project, but is unlikely to occur within project sites. The non-native grassland within the project sites provide minimal suitable habitat for the species.
San Joaquin pocket mouse	*Perognathus inornatus*	--/SSC	Occurs in dry, open grasslands or scrub areas on fine-textured soils.	**Low.** The species may occur in the vicinity of the project, but is unlikely to occur within project sites The non-native grassland within the project sites provide minimal suitable habitat for the species.
Buena Vista Lake ornate shrew	*Sorex ornatus relictus*	FE/SSC	Occupies the marshlands of the San Joaquin Valley and the Tulare Basin.	**Unlikely**. Habitat requirements not present on project sites.
American badger	*Taxidea taxus*	--/SSC	Prefers to live in dry, open grasslands, farmlands, fields, and pastures	**Present**. A deceased adult was observed on the southern border of the Phase 1 project site. Was most likely struck by a vehicle on Stockdale Highway.
San Joaquin kit fox	*Vulpes macrotis mutica*	FE/ST	Include grasslands and scrublands with active oil fields, wind turbines, and an agricultural matrix of row crops, irrigated pasture, orchards, vineyards, and grazed annual grasslands (non-irrigated pasture).	**High**. Species was not detected during reconnaissance; however, numerous observations on Phase 1 and Phase 2 project sites and immediately adjacent have been documented. The observations were made over 30 years ago; however, suitable habitat is present.
Reptiles				
Bakersfield legless lizard	*Anniella grinnelli*	--/SSC	Occurs in moist, loose soil and sparsely vegetated areas.	**Low**. Suitable habitat is very minimal; however, one observation was made within Phase 1 project site in 2006.
California glossy snake	*Arizona elegans occidentalis*	--/SSC	Inhabits arid scrub, rocky washes, grasslands, and chaparral.	**Unlikely**. Habitat requirements not present on project sites.
western pond turtle	*Emys marmorata*	--/SSC	Ponds and small lakes with abundant vegetation. Also seen in marshes, slow-moving streams, reservoirs, and occasionally in brackish water.	**Low.** Species has been detected within the conveyance facilities project site; however, this detection was in 1990.Goose Lake Channel could potentially support this species when inundated with water.

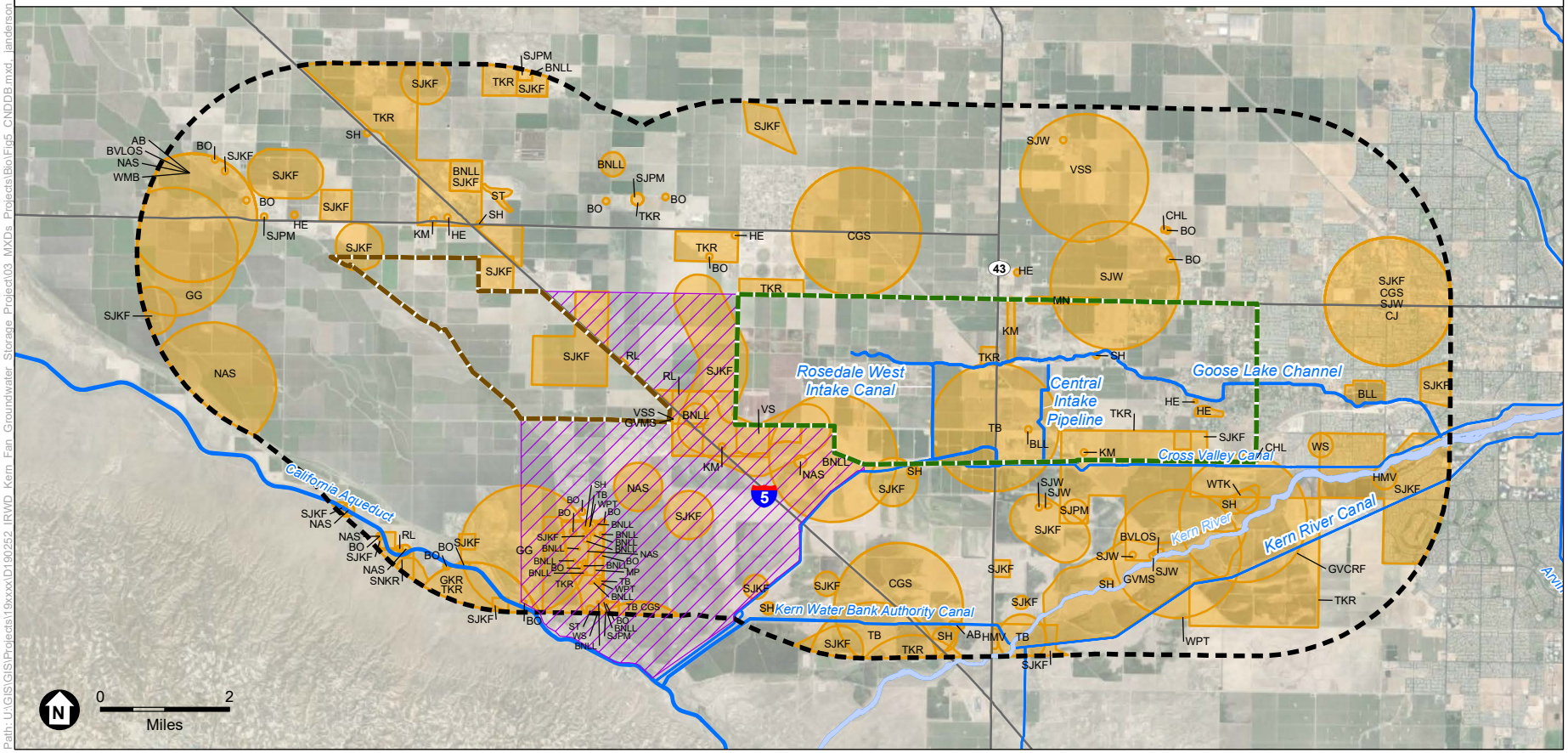
Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
blunt-nosed leopard lizard	*Gambelia sila*	FE/SE	Blunt-nosed leopard lizards live in the San Joaquin Valley region in expansive, arid areas with scattered vegetation. Today they inhabit non-native grassland and alkali sink scrub communities of the Valley floor marked by poorly drained, alkaline, and saline soils, mainly because remaining natural land is of this type. Use small mammal burrows for permanent shelter and dormancy.	**Medium**. One detection of species documented in Phase 1 project site in 2012, as well as several observations within three miles. Suitable habitat on Phase 1 project site (non-native grassland) provides marginal habitat for the species; however, the community is unlikely to support a population of the species.
San Joaquin coachwhip	*Masticophis flagellum ruddocki*	--/SSC	Associated with open, dry habitats, with little to no tree cover; found in valley grassland and saltbush scrub in the San Joaquin valley. Species needs mammal burrows for refuge and ovipositor sites.	**Low**. Habitat requirements are minimal on project sites and no CNDDB detections have been made.
coast horned lizard	*Phrynosoma blainvillii*	--/SSC	Found in a wide variety of vegetation types including coastal sage scrub, annual grassland, chaparral, oak woodland, riparian woodland and coniferous forest.	**Low.** Minimal suitable habitat for the species exists within the project sites.
western spadefoot	*Spea hammondii*	--/SSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rainpools which do not contain bullfrogs, fish, or crayfish are necessary for breeding.	**Low**. Project sites provide very minimal habitat. One CNDDB detection was made within the southwestern corner of the conveyance facilities site in 1996.
giant gartersnake	*Thamnophis gigas*	FE/SE	Ideal habitat would be characterized as having dense emergent vegetation for escape from predation, deep and shallow pools of water (which persist throughout the seasonal cycle of activity) in which to forage and seek cover, open areas along the margins to allow for basking, and upland habitat with access to structures suitable for hibernation and escape from flooding.	**Low.** Species has not been detected within project sites (CNDDB 2020) and project sites provide minimal suitable habitat.
Invertebrates				
Crotch bumble bee	*Bombua crotchii*	--/CE	Inhabits grassland and scrub areas, requiring hot weather.	**Low.** Minimal suitable habitat occurs within project sites and no CNDDB detections have been made.
Hopping's blister beetle	*Lytta hoppingi*	--/SSC	Species is found on flowers.	**Unlikely**. Habitat requirements not present on project sites.

Status

Federal: FE-federally endangered, FT – federally threatened

State: SE – state endangered; state threatened; FP – State Fully Protected, SSC – State Species of Special Concern, CE-Candidate for listing as Endangered

Phase 1 Project Area
Phase 2 Project Area
Kern Fan Conveyance Facilities Area
3-mile Buffer
CNDDB Occurrences
AB - American badger
BLL - Bakersfield legless lizard
BNLL - blunt-nosed leopard lizard
BO - burrowing owl
BVLOS - Buena Vista Lake ornate shrew
CGS - California glossy snake
CHL - California horned lark
CJ - California jewelflower
GG - giant gartersnake
GKR - giant kangaroo rat
GVCRF - Great Valley Cottonwood Riparian Forest
GVMS - Great Valley Mesquite Scrub
HE - Hoover's eriastrum
HMV - Horn's milk-vetch
KM - Kern mallow
MN - Mason's neststraw
MP - mountain plover
NAS - Nelson's antelope squirrel
RL - recurved larkspur
SH - Swainson's hawk
SJKF - San Joaquin kit fox
SJPM - San Joaquin Pocket Mouse
SJW - San Joaquin woollythreads
SNKR - short-nosed kangaroo rat
ST - slough thistle
ST - subtle orache
TB - tricolored blackbird
TKR - Tipton kangaroo rat
VS - Valley Sink Scrub
VSS - Valley Saltbush Scrub
WMB - western mastiff bat
WPT - western pond turtle
WS - western spadefoot
WTK - white-tailed kite



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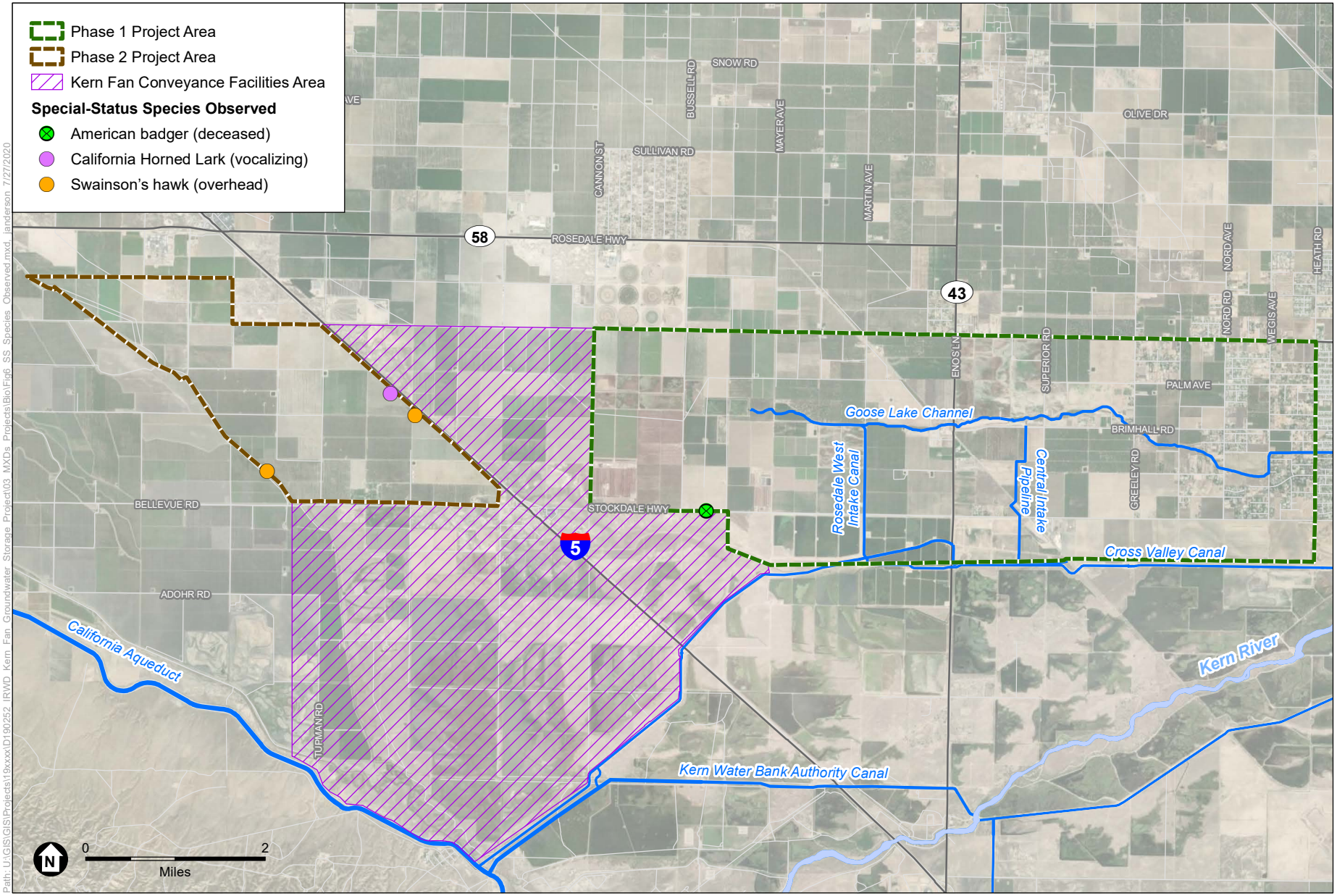
SOURCE: ESRI; Kern County; CDFW

Kern Fan Groundwater Storage Project

Figure 5
CNDDB

ESA



SOURCE: ESRI; Kern County

Kern Fan Groundwater Storage Project

Figure 6

Special-Status Species Observed

ESA

4.9 Wildlife Movement Corridors

Wildlife movement corridors are areas where regional wildlife populations regularly and predictably move during dispersal or migration. Movement corridors in California are typically associated with ridgelines, valleys, rivers and creeks supporting riparian vegetation. Movement corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, by human disturbance, or by the encroachment of urban development. Movement corridors are important as the combination of topography and other natural factors, in addition to urbanization, has fragmented or separated large open space areas. Several wildlife corridors are present within or adjacent to the project sites and are described below.

The Central Valley as a whole, is a wildlife corridor and resting stop for migrating birds along the Pacific Flyway. The Pacific Flyway is a major north-south flyway for migratory birds in America, extending from Alaska to Patagonia. Every year, migratory birds travel some or all of this distance both in spring and in fall, following food sources, heading to breeding grounds, or travelling to overwintering sites. Birds that are migrating along the Pacific Flyway may stop to rest within the recharge basins, Goose Lake Channel or numerous canals in the area to feed and/or rest before continuing their migration. Some species may remain locally for the entire season, but most stay a few days before moving on (Wilson 2010).

Goose Lake Channel, situated within the Phase 1 project site, is considered a wildlife corridor. Goose Lake Channel is a natural channel that flows in an east to west direction and originates from the Kern River. Water is fed from the Kern River by gravity into the channel, which provides water for the recharge basins within the Phase 1 project site. In an on-site discussion with Rosedale Engineer Technician Markus Nygren, he related that Goose Lake Channel provides habitat for aquatic species such as largemouth bass (*Micropterus salmoides*) that come from the Kern River. Additionally, Mr. Nygren has observed waterfowl species such as mallard (*Anas platyrhynchos*) and northern shoveler (*Spatula clypeata*) using the channel, when water is present, for foraging (M. Nygren, personal communication, July 7, 2020).

The Kern Water Bank is located within the conveyance facilities project site. This area is relatively flat and potentially create a corridor to both the Phase 1 and Phase 2 project sites. The habitat value of the Kern Water Bank is deemed high, as the many of the native vegetation communities and habitats have not been disturbed or altered. Migratory and common birds use the recharge basins at the Kern Water Bank as habitat. The American badger that was observed deceased at the southern boundary of the Phase 1 project site during the reconnaissance was most likely traveling from the Phase 1 project site to the Kern Water Bank property, or vice versa.

CHAPTER 5
Project Impacts and Avoidance, Minimization, and Mitigation

5.1 Approach to the Analysis

The proposed project is expected to result in both adverse and beneficial impacts—direct, indirect, and cumulative—to biological resources. There are construction, operational, and maintenance impacts that could result in adverse impacts. Beneficial impacts could occur from the operation and maintenance of the proposed project and include the creation of intermediate wetlands and bird habitat and the provision of water for fisheries. In this section, we examine and describe both impact types.

Under the stipulations of CEQA, potential impacts to biological resources could be considered significant if actions associated with the proposed project are not mitigated. In this section, the impact mechanisms for the potential impacts are described. In Section *5.2, Thresholds of Significance,* the CEQA thresholds for biological resources are provided. In Section 5.3, *Impact Analysis,* the potential impacts of the proposed project are evaluated in terms of the thresholds of significance—both beneficial and adverse impacts. For potential adverse impacts deemed significant to biological resources, avoidance, minimization, and mitigation measures were developed and are provided in Section 5.4, *Avoidance, Minimization, and Mitigation Measures.* Implementation of the proposed measures would result in a less than significant impact determination for biological resources from the proposed project.

Impact mechanisms from construction, operations, and maintenance activities used to evaluate the adverse and beneficial impacts are as follows:

- **Habitat modification (adverse).** Direct or indirect impacts could result from habitat modification during construction, operations, and maintenance. Impacts to biological resources would result primarily during earth and vegetation/orchard removal, grading, digging, and equipment movement during construction. Vegetation and facility maintenance during operations and maintenance could also result in impacts. More mobile species like birds and larger mammals are expected to disperse into nearby habitat areas during activities. Active nesting birds and active burrows for species such as blunt-nosed leopard lizard and Tipton kangaroo rat could potentially be impacted by grading and vegetation removal and maintenance activities. These activities could result in the direct mortality from the crushing of occupied burrows or destruction of occupied nests. Special-status plant species with potential to occur on site could also be impacted by construction and maintenance activities. This includes known occurrences and species with a potential to occur within the conveyance facilities project site. Direct impacts include trampling or destruction of the plants from

construction equipment or removal during maintenance activities. Direct impacts include trampling or destruction of the plants from construction equipment or removal during maintenance activities.

- **Habitat modification (beneficial).** Intermittent wetlands will be established during recharge events in the recharge basins during proposed project operation. During the years that the proposed project takes and recharges water into storage, the basins will be inundated with water and will provide intermittent wetland habitat to support waterfowl, shorebirds, raptors and other migratory birds along the Pacific Flyway. The fishery ecosystem and special-status fish species associated with the Sacramento-San Joaquin River Delta (Delta) could be beneficially affected by habitat modifications during operations of the proposed project. The fishery ecosystem and special-status fish species benefits are detailed in Appendix C and summarized in the impact analysis below.
- **Pesticide use (adverse)**. Direct or indirect impacts could result from pesticide use during operations and maintenance. Use of pesticides and rodenticides is proposed for use to control weeds and rodents. Special-status wildlife and animal species in the project sites could potentially be impact from pesticide use.
- **Exterior lighting (adverse).** Use of nighttime lighting on the project sites could affect the level of use by wildlife. Nighttime lighting could potentially expose special-status species trying to evade predators within their habitats.
- **Vehicle collisions (adverse)**. The use of access roads by construction/maintenance vehicles could result in accidental road-mortality if these species occur on roads during construction and operations and maintenance activities. Vehicles could cause direct mortality or injury to wildlife that are unable to move out of the way of vehicle traffic. Vehicle and equipment travel on dirt access roads during operation and maintenance may disturb special-status wildlife and plant species. Vehicle collisions with San Joaquin kit fox, American badger, burrowing owl and other medium-large species could occur.

5.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the proposed project would result in a significant impact on biological resources if it would:

1. 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.
2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.
3. 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.
4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

5.3 Impacts Analysis

Issue 1: Would the proposed project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Special Status Plant and Wildlife

Special-Status Plants

Special-status plants have the potential to be present in the conveyance facilities project site and could be affected by the proposed project. Numerous native vegetation communities are present within the conveyance facilities project site that could support seven special-status plant species, with medium potential to occur. These species are California jewelflower, Hoover's eriastrum, Kern mallow, recurved larkspur, San Joaquin woollythreads, slough thistle, and subtle orache. These species could be adversely affected by habitat modification or pesticide use. Mitigation measures are recommended to be implemented prior to the commencement of construction activities (described below in Section 5.4).

Based on the lack of suitable habitat and previous disturbance from agriculture and residential development, no special-status plant species are expected to occur on the Phase 1 or Phase 2 project sites, though several CNDDB detections have been made. Based on the date of documentation of CNDDB occurrences and current habitat conditions and site use, these occurrences are expected to be extirpated.

Special-Status Wildlife

Species-status wildlife species have the potential to be present in the project sites and could be affected by the proposed project. Based on the presence of suitable habitat within the project sites, there is a medium or high potential for six special-status wildlife species to occur in the project sites: burrowing owl, tricolored blackbird, Tipton kangaroo rat, blunt-nosed leopard lizard, Nelson's antelope squirrel, and San Joaquin kit fox. Additionally, three special-status wildlife species were detected during the reconnaissance: Swainson's hawk, California horned lark, and American badger. Numerous other special-status wildlife species have been detected within or adjacent to the project sites including: western pond turtle, and mountain plover; however, almost all of these detections are between 30 and 75 years old (CNDDB 2020) and are not expected on site.

These species could be adversely affected by habitat modification, pesticide use, exterior lighting, and vehicle collisions during construction. Post-construction habitat modification is expected to improve or maintain habitat conditions for all special-status species. The intermittent wetland habitat could improve foraging conditions for all special-status species by increasing prey availability. Upland vegetation and agricultural lands could maintain habitat value for all special-status species. The berms could provide burrow locations for the special-status mammals, burrowing owl, and blunt-nosed leopard lizard. Installation of raptor boxes and perches could attract Swainson's hawk. If special-status species become established on site post-construction, avoidance and minimization measures would be required during operations and maintenance. Mitigation measures are recommended to be implemented (described below in Section 5.4).

Nesting Birds

Nesting birds have the potential to be present in the project sites and could be affected by the proposed project. Migratory and common bird species may utilize all habitats within the project sites, including but not limited to, trees, vegetation, and building structures for foraging and breeding purposes. These species could be adversely affected by habitat modification, pesticide use, exterior lighting, and vehicle collisions during construction. Post-construction habitat modification is expected to improve habitat conditions. If nesting birds become established on site post-construction, avoidance and minimization measures would be required during operations and maintenance. Mitigation measures are recommended to be implemented (described below in Section 5.4).

Fishery Ecosystem and Special-Status Fish

The fishery ecosystem and special-status fish species associated with the Sacramento-San Joaquin River Delta (Delta) could be beneficially affected by habitat modifications during operations of the proposed project. The California Water Commission (CWC) has administered the Water Storage Investment Program (WSIP) to fund public benefits of eight water storage projects, one of them being the Kern Fan Groundwater Storage Project (CWC 2020). The WSIP identifies 16 priorities for ecosystem benefits to the fishery ecosystem. These 16 ecosystem benefits include:

- Priority 1: Provide cold water at times and locations to increase the survival of salmonid eggs and fry.
- Priority 2: Provide flows to improve habitat conditions for in-river rearing and downstream migration of juvenile salmonids.
- Priority 3: Maintain flows and appropriate ramping rates at times and locations that will minimize dewatering of salmonid redds and prevent stranding of juvenile salmonids in side channel habitat.
- Priority 4: Improve ecosystem water quality.
- Priority 5: Provide flows that increase dissolved oxygen and lower water temperatures to support anadromous fish passage.
- Priority 6: Increase attraction flows during upstream migration to reduce straying of anadromous species into non-natal tributaries.

- Priority 7: Increase Delta outflow to provide low salinity habitat for Delta smelt, longfin smelt, and other estuarine fishes in the Delta, Suisun Bay, and Suisun Marsh.
- Priority 8: Maintain or restore groundwater and surface water interconnection to support instream benefits and groundwater dependent ecosystems.
- Priority 9: Enhance flow regimes or groundwater conditions to improve the quantity and quality of riparian and floodplain habitats for aquatic and terrestrial species.
- Priority 10: Enhance the frequency, magnitude, and duration of floodplain inundation to enhance primary and secondary productivity and the growth and survival of fish.
- Priority 11: Enhance the temporal and spatial distribution and diversity of habitats to support all life stages of fish and wildlife species.
- Priority 12: Enhance access to fish spawning, rearing, and holding habitat by eliminating barriers to migration.
- Priority 13: Remediate unscreened or poorly screened diversions to reduce entrainment of fish.
- Priority 14: Provide water to enhance seasonal wetlands, permanent wetlands, and riparian habitat for aquatic and terrestrial species on State and Federal wildlife refuges and on other public and private lands.
- Priority 15: Develop and implement invasive species management plans utilizing techniques that are supported by best available science to enhance habitat and increase the survival of native species.
- Priority 16: Enhance habitat for native species that have commercial, recreational, scientific, or educational uses.

Ecosystem Priority 2 and 12 are the primary beneficiaries of an April flow pulse on the Feather River (CFS 2020). Both priorities seek to enhance the access to spawning grounds and flows to improve habitat conditions for in-river rearing and downstream migration of juvenile salmonids, respectively. Species that would see these benefits to their migration and spawning patterns include Central Valley juvenile spring-run Chinook salmon (*Oncorhynchus tshawytscha*), Central Valley juvenile winter-run Chinook salmon, juvenile steelhead (*Oncorhynchus mykiss*), and green sturgeon (*Acipenser medirostris*).

Cramer Fish Sciences (CFS) (2020, **Appendix C**) consulted with MBK Engineers and IRWD to determine how an additional water supply of 18 thousand acre-feet (TAF) made available by the proposed project could be used to provide the greatest benefit to ecosystem priorities for fisheries. Monthly flow data (1922 through 2003) representing two future conditions (2030 and 2070) and two scenarios (Project and no project) were provided by MBK Engineers. A total of four different CALSIM[1] scenarios were analyzed. Under existing conditions, the Feather River's baseflow is less than 3,000 cfs in dry years and could be as low as 1,000 cfs (the minimum flow required). CFS recommended a pulse released from Lake Oroville in the month of April, which would occur in dry or critically dry years.

[1] CALSIM is a water resources planning model that simulates operations of the SWP and the Central Valley Project and much of the water resources infrastructure in the Central Valley and the Delta.

Lake Oroville, a reservoir located in Butte County, California, is a very important fixture within the SWP. The reservoir, impounding the Feather River, stores water for the state of California, provides flood control, recreation, protects fish and wildlife, and assists in freshwater releases controlling salinity intrusion of the Delta (USGS 2013). The Thermalito Afterbay is an off-stream reservoir that provides storage for the water required by the pumpback operation to Lake Oroville, helps regulate the power system, produces controlled flow in the Feather River downstream from the Oroville-Thermalito facilities, and provides recreation. It also serves as a warming basin for agricultural water delivered to farms east of the Thermalito Afterbay (NCWA 2020). The Thermalito Afterbay Outlet (TAO) is an outlet pipe that releases water from Thermalito Afterbay to the Feather River.

CFS assumed the 18,000 AF would be applied as a 3.75 day, 2,400 cfs increase in Feather River flows released from the TAO. Releasing this water from the TAO is important because the Feather River downstream of TAO has no ramping criteria for flows greater than 2,500 cfs (CFS 2020, NMFS 2016a). CALSIM analysis indicated the proposed project could provide April flow pulses (18 TAF) for seven dry or critically dry years under 2030 future condition, and for five dry years under 2070 future condition (CFS 2020). Flow pulses produced by the proposed project occurred exclusively in dry years, with Feather River base flows at less than 3,000 cfs.

CFS's quantitative analysis focused on the benefits to outmigrating juvenile spring-run and winter-run Chinook salmon. The Feather River supports both natural and hatchery origin spring-run Chinook salmon. The National Marine Fisheries Service (NMFS) considers Feather River spring-run Chinook salmon as part of the listed Central Valley spring-run Chinook Salmon Evolutionary Significant Unit (ESU) (CFS 2020, NMFS 2018b). The estimated monthly number of hatchery origin spring-run smolts (the stage when a young salmonid migrates from freshwater to the ocean) entering the Sacramento River, the estimated monthly number of natural origin spring-runs smolts entering the Sacramento River from the Feather River, and the survival for both hatchery and natural origin smolts are modeled as a function of monthly Feather River flows provided from CALSIM by MBK Engineers (CFS 2020).

While winter-run Chinook salmon do not occur in the Feather River, a flow pulse that reaches the Sacramento River has the potential to benefit juvenile winter-run chinook during outmigration downstream of the Feather River and through the Delta.

Survival rates for migrating juvenile Chinook salmon from the Sacramento River to San Francisco Bay were estimated using the Delta Passage Model (DPM) with four different CALSIM flow scenarios (CFS 2020, CWF 2016). The DPM was developed by CFS to integrate study findings related to how water project operations influence the survival of juvenile Chinook salmon. Although the DPM is based primarily on studies of winter-run Chinook salmon smolt surrogates (late fall–run Chinook salmon), it was applied for this analysis to winter-run and spring-run Chinook salmon by adjusting emigration timing and assuming that all migrating Chinook salmon smolts will respond similarly to Delta conditions.

Benefits for Chinook salmon would occur in years when the proposed project allows for a Feather River flow pulse. On average, proposed project flow pulses were estimated to improve survival

relative to the base flow condition by approximately 4.6%. For spring-run Chinook salmon, years with flow pulses would produce 121 to 354 additional adult Chinook salmon from each of the seven proposed project flow pulses occurring in the 2030 estimated condition, and 168 to 375 additional adults for each of the five flow pulses occurring in the 2070 estimated condition (Figure 10 in Appendix C). For winter-run Chinook salmon, benefits would range from 26 to 57 additional adult Chinook winter-run occurring with the seven pulses for the 2030 condition, and with the five pulses for the 2070 estimated condition (Figure 11 in Appendix C). Losses due to Delta diversions could occur for both spring-run and winter-run Chinook salmon, but these losses would be outweighed by larger benefits which accumulate across all years (depicted on Figures 10 and 11 in Appendix C**)**.

For green sturgeon, April pulse flows would be expected to enhance upstream passage for spawning adults. Assuming that the Feather River has sufficient habitat to accommodate an increased spawning population (currently 25 or fewer spawners) similar to the Sacramento River spawning population (364 spawners), the annualized benefit attributable to the proposed project would be approximately 13 and 10 adult additional spawners accessing the Feather River per year for the 2030 and 2070 future conditions.

For steelhead, an additional 63 to 127 adults would be benefited for the 2030 future condition and an additional 42 to 83 adults would be benefited for the 2070 future condition (see Tables 13 and 14 in Appendix C).

Waterfowl and Migratory Birds

Waterfowl and migratory birds could be beneficially affected by habitat modifications during operations and maintenance of the proposed project. The proposed project is situated within the Pacific Flyway, a major north-south flyway for migratory birds in America, extending from Alaska to Patagonia. Each year, a billion birds migrate along the Pacific Flyway. Habitat loss, water shortages, diminishing food sources, and climate change all threaten birds that use the Pacific Flyway (National Audubon Society 2020).

The recharge basins that would be created as a result of the proposed will be designed to establish intermittent wetland habitat through intermittent recharge events. The intermittent wetland habitat can support waterfowl, shorebirds, raptors and other migratory birds along the Pacific Flyway. The nearby recharge basins at the Kern Water Bank are re-establishing a thriving intermittent wetland habitat along the recharge basins, where marsh-like environments are established during recharge periods and create ideal habitat for waterfowl, shorebirds, raptors, and other native and migrating birds (KWBA 2020).

Willow (*Salix* sp.), cottonwood (*Populus* sp.), sedge (*Carex* sp.) and other wetland vegetation have re-emerged along the edges of the Kern Water Bank recharge basins and earthen canals. These protected areas provide critical nesting and foraging habitat for more than 40 species of waterfowl and other birds (KWBA 2020). Some of these species include but are not limited to: Caspian tern (*Hydroprogne caspia*), double-crested cormorant (*Phalacrocorax auritus*), American white pelican (*Pelecanus erythrorhynchos*), and tri-colored blackbird.

The Kern Audubon Society conducts bird counts often to educate, inform and study trends and migration of waterfowl species, as well as common bird species. In 2009, the Kern Audubon Society conducted a three-day survey at the Kern River Preserve and detected 246 different species of birds, many of which were waterfowl and/or migratory birds (Kern Audubon Society 2010). Some of these species include: American widgeon (*Mareca Americana*), gadwall (*Mareca strepera*), snow goose (*Chen caerulescens*), Canada goose (*Branta Canadensis*), and cinnamon teal (*Anas cyanoptera*). Needless to say, migratory waterfowl and resident species will seek to use the recharge basins as grounds for resting, foraging and breeding. Other waterbodies in the vicinity of the proposed project that migratory waterfowl use include Lake Buena Vista, Kern National Wildlife Refuge, Pixley National Wildlife Refuge, Kern River, Kern River Preserve, Tule Elk State Reserve, and Lokern Ecological Reserve.

Issue 2: Would the proposed project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?

Sensitive natural communities have the potential to be present in the conveyance facilities project site and could be affected by the proposed project. After review of the vegetation communities mapped by California State University, Chico (described in Section 4.3 above), there are five native vegetation communities that are considered sensitive in the conveyance facilities project site, including: Bush seepweed scrub - *Suaeda moquinii* Shrubland Alliance and Goodding's willow - *Salix gooddingii* Forest & Woodland Alliance, Red willow - *Salix laevigata* Woodland and Forest Alliance, Iodine brush scrub - *Allenrolfea occidentalis* Shrubland Alliance, and Mesquite thickets - *Prosopis glandulosa - Prosopis velutina - Prosopis pubescens* Woodland Alliance, all with an S3 ranking. If these sensitive vegetation communities are anticipated to be impacted by the proposed project, mitigation measures are recommended to be implemented prior to the commencement of construction activities (described below in Section 5.4).

Issue 3: Would the proposed project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

There are potentially several wetlands and jurisdictional features in the project sites that may be impacted by habitat modification during construction. The hydrophytic vegetation within the Rosedale West Intake Canal are being maintained only by a man-made source of water and hydrology. Should these sources of water (i.e., irrigation for crops) be terminated, the vegetation would no longer exist and, therefore the areas are not considered wetlands. The canal is a man-made water supply conveyance facility and thus not considered Waters of the United States or Waters of the State. This features would not be considered under the jurisdiction of (or subject to regulation by) the USACE (per Section 404 of the CWA), the CDFW (per Section 1600 of the Fish and Game Code), or the RWQCB (per Section 401 of the CWA). The riparian vegetation and conditions found in Goose Lake Channel and on the conveyance facilities project site could potentially meet the requirements of a wetland as defined by the USACE and RWQCB.

Mitigation measures are recommended to be implemented prior to the commencement of construction activities (described below in Section 5.4).

Wetlands resources could be beneficially affected by habitat modifications during operations and maintenance of the proposed project via creation. The recharge basin design is intended to create intermittent wetlands and bird habitat. Per the recommendation of the Environmental Defense Fund (IRWD 2020, **Appendix D**), recharge basins will be constructed at multiple water depths to benefit both shorebirds and waterfowl. Shorebirds prefer mudflats to a depth of up to 6" with sparse vegetation (<40%) while waterfowl prefer depths of 6" to above 18" with a combination of open water and wetland cover. Dry land (berms or islands) are important for resting areas with dense vegetation (IRWD 2020).

Issue 4: Would the proposed project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Wildlife corridors are present in the project sites and proposed project affects have the potential to be neutral or positive. Though several wildlife corridors exist on or adjacent to the project sites, including Goose Lake Channel, Kern Water Bank, Tule Elk State Reserve, and the Pacific Flyway, configuration of the recharge basins or conveyance facilities would not impede or restrict wildlife movement. The majority of the project sites are currently used for agricultural purposes and heavy disturbance still occurs (i.e. vehicles traveling in and out of the orchards, transportation of agriculture equipment and regular pumping and use of the canals for crop irrigation). Species are most likely used to the level of disturbance at these locations and aware of the travel routes needed to access other adjacent open areas and corridors. Current wildlife movement will not be impacted or restricted; therefore, no mitigation measures are recommended.

The proposed project is also expected to benefit the fishery ecosystem downstream of Lake Oroville, in the Feather River and then into the Delta. The proposed project will benefit Central Valley salmonids with flows to improve habitat conditions for in-river rearing and downstream migration of juvenile salmonids. Salmonid species that would see these benefits to their migration patterns include Central Valley juvenile spring-run Chinook salmon, Central Valley juvenile winter-run Chinook salmon and juvenile steelhead. In addition, green sturgeon will also benefit from the proposed project due to increased adult access into the Feather River when pulse flows occur. An expanded description of proposed project benefits to the fishery ecosystem is detailed in the subsection titled "Fishery Ecosystem and Special-Status Fish Species," in Section 5.3 above.

Issue 5: Would the proposed project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

There are local policies and ordinances protecting biological resources that the proposed project has the potential to conflict with. The proposed project is within the jurisdiction of the Kern County General Plan and the Metropolitan Bakersfield General Plan. Several biological resource ordinances and policies are required for implementation to protect special-status species.

Mitigation measures recommended for special-status wildlife species associated with "Issue 1" above, will also cover protecting the ordinances and policies implemented in the Kern County General Plan and the Metropolitan Bakersfield General Plan.

Issue 6: Would the proposed 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 proposed project has the potential to conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Approximately 60% of the Phase 1 project site falls within the MBHCP area. The MBHCP's primary focus is on lands converted to urban uses (MBHCP 1994, ESA 2013). The MBHCP sets forth a program for the preservation and protection of habitat for several rare or endangered species found in the HCP area in exchange for the loss of some existing habitat from urban development. The MBHCP permit only applies to City or County actions, or actions by others, which involve City or County permits. Special agencies, such as Rosedale, that are exempt from local permitting have other options with regard to endangered species issues, including resolving endangered species issues directly with USFWS and CDFW (MBHCP 1994, ESA 2013). The proposed project would not result in the conversion of land to urban uses. Mitigation measures recommended for special-status wildlife species associated with "Issue 1" above, will reduce proposed project impacts to threatened and endangered species to less than significant levels. No additional mitigation would be required to be consistent with the MBHCP.

The Kern Water Bank HCP/NCCP is a plan to accomplish both water conservation and environmental objectives. The primary water conservation objective is the storage of water in aquifers during times of surplus for later recovery during times of shortage (KWBA 1997). In addition, conservation areas are established within the HCP/NCCP area. Mitigation measures are recommended to ensure that the proposed project does not adversely impact biological resource mitigation within the HCP/NCCP.

5.4 Avoidance, Minimization, and Mitigation Measures

Special-Status Plants

Construction, operations, and maintenance activities could result in impacts to special-status plants. The following measure is recommended to be implemented to avoid potentially significant impacts to special-status plants.

> **BIO-1. Impacts to Special-Status Plant Species.** Prior to the start of construction activities that could affect special-status plant species, a qualified botanist shall conduct a focused survey within the Conveyance Facilities project area for California jewelflower, Hoover's eriastrum, Kern mallow, recurved larkspur, San Joaquin woollythreads, slough thistle, and subtle orache. Focused rare plant surveys shall occur during the typical blooming periods of special-status plants with the potential to occur. If a special-status plant species is found to be present, and avoidance of the species and/or habitat is not

feasible, the Authority shall prepare and implement a Revegetation/Restoration Mitigation Plan. The Revegetation/Restoration Mitigation Plan will guide activities during construction and operations and maintenance to avoid and minimize impacts to special-status plant species.

Special-Status Wildlife

Construction, operations, and maintenance activities could result in impacts to special-status wildlife. The following measures are recommended to be implemented to avoid potentially significant impacts to special-status wildlife.

BIO-2: **Pesticide Use Plan**. If pesticides will be applied to any areas within the project areas, the Authority shall develop a Pesticide Use Plan that will detail how pesticides, rodenticides, and/or herbicides will be used and how application will not impact special-status plant and wildlife species, nesting birds, wetlands and jurisdictional features, and sensitive natural communities.

BIO-3: **Impacts to Swainson's Hawk**. If construction activities are scheduled to take place outside of the Swainson's hawk nesting season (which runs from March 1 – September 15), then no preconstruction clearance surveys or subsequent avoidance buffers are required. If construction activities are initiated within the nesting season then preconstruction nesting surveys shall be conducted by a qualified biologist prior to ground disturbance, in accordance with the guidance provided in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee, 2000). The required windshield surveys shall cover a one-half mile radius around the project sites. If a nest site is found, the qualified biologist shall determine the appropriate buffer zone around the nest within which project-related construction activities would be avoided.

BIO-4: Impacts to Burrowing Owl. A pre-construction survey shall be conducted for burrowing owls 14 to 30 days prior to clearing of the site by a qualified biologist in accordance with the most recent CDFW protocol, currently the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). Surveys shall cover suitable burrowing owl habitat disturbed by construction including a 500-foot buffer. The survey would identify adult and juvenile burrowing owls and signs of burrowing owl occupation. This survey shall include two early morning surveys and two evening surveys to ensure that all owl pairs have been located. If occupied burrowing owl habitat is detected on the proposed project site, measures to avoid, minimize, or mitigate impacts shall be incorporated into the proposed project and shall include, but not be limited to, the following:

- If owls are identified on or adjacent to the site, a qualified biologist shall provide a pre-construction Worker's Environmental Awareness Program to contractors and their employees that describes the life history and species protection measures that are in effect to avoid impacts to burrowing owls. Construction monitoring will also occur throughout the duration of ground-disturbing construction activities to ensure no impacts occur to burrowing owl.
- Construction exclusion areas shall be established around the occupied burrows in which no disturbance shall be allowed to occur while the burrows are occupied. Buffer areas shall be determined by a qualified biologist based on the

recommendations outlined in the most recent *Staff Report on Burrowing Owl Mitigation* (CDFW 2012).

- If occupied burrows cannot be avoided, a qualified biologist shall develop and implement a Burrowing Owl Management Plan.

BIO-5: **Impacts to San Joaquin Kit Fox**. Prior to commencement of project activities, a qualified biologist shall conduct a USFWS-approved "early evaluation" of the project area to determine if the project sites represent San Joaquin kit fox habitat. If the evaluation shows that the San Joaquin kit fox does not utilize the project sites, and the project will not result in take, then no further mitigation shall be required for this endangered species. If the "early evaluation" finds the presence of kit fox, a San Joaquin kit fox survey to be conducted by a qualified biologist, in accordance with the most recent USFWS San Joaquin Kit Fox Survey Protocol. If it is determined that the San Joaquin kit fox utilizes the property then the following measures are required to avoid potential adverse effects to this species:

- The Authority shall determine appropriate project modifications to protect kit fox, including avoidance, minimization, restoration, preservation, or compensation.
- If evidence of active or potentially active San Joaquin kit fox dens is found within the area to be impacted by the proposed project, appropriate compensation for the habitat loss shall be determined and provided.

BIO-6: Impacts to Blunt-Nosed Leopard Lizard. Prior to commencement of project ground disturbing construction, a qualified biologist shall survey for blunt-nosed leopard lizard, in accordance with the most recent CDFW *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*. If it is determined that blunt-nosed leopard lizard is present on the project areasThe Authority shall initiate the appropriate project modifications to protect blunt-nosed leopard lizard, including avoidance, minimization, restoration, preservation, or compensation.

BIO-7: Impacts to Tipton Kangaroo Rat. Prior to commencement of project activities, a qualified biologist shall survey for Tipton kangaroo rat, in accordance with the most USFWS *Survey Protocol for Determining* Presence *of San Joaquin Kangaroo Rats*. If it is determined that Tipton kangaroo rat has the potential to utilize the project areas, then the following measures are required to avoid potential adverse effects to this species:

- The Authority shall have a qualified biologist conduct trapping to determine if there is a presence of the Tipton kangaroo rat.
- If there is presence, the Authority shall determine appropriate project modifications to protect Tipton kangaroo rat, including avoidance, minimization, restoration, preservation, or compensation.

BIO-8: Impacts to American Badger. Prior to commencement of project activities, a qualified biologist shall survey for American badger. Though there isn't a specific survey protocol for this species, American badger share similar habitat as burrowing owl and San Joaquin kit fox. Surveys shall be conducted for American badger concurrently with either burrowing owl or San Joaquin kit fox. If it is determined that American badger are

detected on the project areas, then the following measures are required to avoid potential adverse effects to this species:

- The Authority shall determine appropriate project modifications to protect American badger, including avoidance, minimization, restoration, preservation, or compensation.

BIO-9: Impacts to Nelson's Antelope Squirrel. Prior to commencement of project activities, a qualified biologist shall survey for Nelson's antelope squirrel. If it is determined that Nelson's antelope squirrel is detected on the project areas, then the following measures are required to avoid potential adverse effects to this species:

- The Authority shall determine appropriate project modifications to protect Nelson's antelope squirrel, including avoidance, minimization, restoration, preservation, or compensation.

BIO-10: Operations and Maintenance Plan. Prior to commencement of project operations and maintenance activities, the Authority shall develop an Operations and Maintenance Plan that details how special-status plant and wildlife species, nesting birds and sensitive natural communities will not be impacted by operations and maintenance activities. Vehicle collisions with special-status wildlife or vehicle trampling of special-status plant species or sensitive natural communities is one example of how operations and maintenance activities could potentially impact biological resources. Some operations and maintenance activities may include pump and facility maintenance and vehicle operation on access roads.

Nesting Birds

Construction activities could result in impacts to nesting birds and active nests. The following mitigation measure is recommended to be implemented to avoid potentially significant impacts to nesting birds or active nests during project construction activities.

BIO-11: Impacts to Nesting Birds and Active Nests. If the nesting bird season cannot be avoided and construction or vegetation removal occurs between March 1 – September 15 (January 1 to July 31 for raptors), the following measures would reduce potential impacts to nesting and migratory birds and raptors to less than significant levels:

- Within 15 days of site clearing, a qualified biologist shall conduct a preconstruction, migratory bird and raptor nesting survey. The biologist must be qualified to determine the status and stage of nesting by migratory birds and all locally breeding raptor species without causing intrusive disturbance. This survey shall include species protected under the Migratory Bird Treaty Act including California horned lark, which was detected during the July 2020 reconnaissance and tri-colored blackbird, which has a medium potential to occur on-site. The survey shall cover all reasonably potential nesting locations for the relevant species on or closely adjacent to the proposed project site.
- The preconstruction survey shall cover all reasonably potential nesting locations on and within 300 feet of the proposed removal areas, and areas that would be occupied by ground-nesting species such as killdeer. A 500-foot radius shall be

surveyed in areas containing suitable habitat for nesting raptors, such as trees, utility poles and buildings.

- Nesting habitat should be removed prior to the bird breeding season (March 1 – September 15).
- If an active nest is confirmed by the biologist, no construction activities shall occur within 250 feet of the nesting site for migratory birds and within 500 feet of the nesting site for raptors. The buffer zones around any nest within which project-related construction activities would be avoided can be reduced as determined acceptable by a qualified biologist. Construction activities may resume once the breeding season ends (March 1 – September 15), or the nest has either failed or the birds have fledged.

Sensitive Natural Communities

Construction activities could result in impacts to sensitive natural communities. The following measure is recommended to be implemented to avoid potentially significant impacts to sensitive natural communities during construction activities.

BIO-12: Impacts to Sensitive Natural Communities. If sensitive natural communities will be impacted from construction activities, a focused survey by a qualified botanist shall be conducted to assess and delineate the potential impacts. If evidence of impacts to these sensitive natural communities are observed or anticipated, compensation for the habitat loss shall be provided.

Wetlands and Jurisdictional Resources

Construction activities could result in impacts to potential wetlands and jurisdictional resources. The following measure is recommended to be implemented to avoid potentially significant impacts to wetlands or jurisdictional resources during project construction activities.

BIO-13: Impacts to Wetlands and Jurisdictional Resources. Prior to any disturbance of potential jurisdictional resources within the project areas, a jurisdictional delineation of water courses shall be conducted for the purposes of identifying features or habitats that would be impacted by project activities and subject to the jurisdiction of the USACE, RWQCB, and CDFW. The findings shall be included in a jurisdictional delineation report suitable for submittal to these agencies for obtaining a Section 404 permit and/or CDFW Streambed Alteration Agreement.

Prior to project activities that would result in the discharge of fill or dredged material within waters of the U.S., a Section 404 CWA permit shall be obtained from the USACE and a Section 401 Water Quality Certification shall be obtained from the RWQCB. Prior to activities within streams, ponds, seeps or riparian habitat, or use of material from a streambed, the project applicant shall obtain Waste Discharge Requirements for impacts to waters not subject to the CWA, provide written notification to CDFW pursuant to Section 1602 of the Fish and Game Code, ensure the notification is complete as provided in Section 1602, and comply with the terms of conditions of any agreement CDFW may issue in response to the notification.

Habitat Conservation Plan/Natural Community Conservation Plan

Construction, operations and maintenance activities could result in conflicts to the Kern Water Bank HCP/NCCP. The following measure is recommended to be implemented to avoid potentially significant impacts to biological resources during project construction, operation and maintenance activities.

> **BIO-14: Conflictions with Kern Water Bank HCP/NCCP**. Should facilities be located on the Kern Water Bank the Authority shall initiate discussions with the Kern Water Bank Authority to ensure Conveyance Facilities located in the Kern Water Bank HCP/NCCP avoid impacts to covered species within the HCP/NCCP area during construction, operations, and maintenance.

CHAPTER 6
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Appendix A
Representative Site Photos

Photo 1. Facing northwest. Photo depicts pistachio orchard within Phase 1 project site (7/7/20).

Photo 2. Facing north. Photo depicts pistachio orchard within Phase 1 project site (7/7/20).

Photo 3. Facing west. Photo depicts non-native grassland within northeast corner of Phase 1 project site (7/7/20).

Photo 4. Facing south. Photo depicts non-native grassland within northeast corner of Phase 1 project site (7/7/20).

Photo 5. Facing south. Photo depicts active orchard within Phase 1 project site (7/7/20).

Photo 6. Facing north. Photo depicts a previously completed Rosedale Groundwater Basin within Phase 1 project site (7/7/20).

Photo 7. Facing west. Photo depicts a previously completed Rosedale Groundwater Basin within Phase 1 project site (7/7/20).

Photo 8. Facing north. Photo depicts a previously completed Rosedale Groundwater Basin within Phase 1 project site (7/7/20).

Photo 9. Facing north. Photo depicts an active orchard within the southern boundary of Phase 2 project site (7/6/20).

Photo 10. Facing west. Photo depicts an active orchard within the southern boundary of Phase 2 project site (7/6/20).

Photo 11. Facing northwest. Photo depicts the East Side Canal, which is situated just outside of the western boundary of Phase 2 project site (7/6/20).

Photo 12. Facing north. Photo depicts fallow agriculture lands on the right side and the East Side Canal on the left side, of the western access road within Phase 2 project site (7/6/20).

Photo 13. Facing south. Photo depicts alfalfa fields located adjacent to the eastern access road within Phase 2 project site (7/6/20).

Photo 14. Facing east. Photo depicts a deceased American badger. Badger was most likely struck by a passing vehicle on Stockdale Highway, southern boundary of Phase 1 project site (7/7/20).

Photo 15. Facing east. Photo depicts access road on Kern Water Bank property, within the conveyance facilities project site (7/6/20).

Photo 16. Facing northeast. Photo depicts access road on Kern Water Bank property, within the conveyance facilities project site (7/6/20).

Photo 17. Facing southeast. Photo depicts annual grassland located on the Tule Elk State Reserve, within the conveyance facilities project site (7/6/20).

Photo 18. Facing northeast. Photo depicts annual grassland located on the Tule Elk State Reserve, within the conveyance facilities project site (7/6/20).

Appendix B

CNDDB and CNPS Search Results

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Buttonwillow (3511944) OR Rio Bravo (3511943) OR East Elk Hills (3511934) OR Tupman (3511933) OR Rosedale (3511942) OR Stevens (3511932) OR Millux (3511922) OR Mouth of Kern (3511923) OR Taft (3511924))
 AND Taxonomic Group IS (Dune OR Scrub OR Herbaceous OR Marsh OR Riparian OR Woodland OR Forest OR Alpine OR Inland Waters OR Marine OR Estuarine OR Riverine OR Palustrine OR Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
American badger *Taxidea taxus*	AMAJF04010	None	None	G5	S3	SSC
Bakersfield legless lizard *Anniella grinnelli*	ARACC01050	None	None	G2G3	S2S3	SSC
blunt-nosed leopard lizard *Gambelia sila*	ARACF07010	Endangered	Endangered	G1	S1	FP
Buena Vista Lake ornate shrew *Sorex ornatus relictus*	AMABA01102	Endangered	None	G5T1	S1	SSC
burrowing owl *Athene cunicularia*	ABNSB10010	None	None	G4	S3	SSC
California glossy snake *Arizona elegans occidentalis*	ARADB01017	None	None	G5T2	S2	SSC
California horned lark *Eremophila alpestris actia*	ABPAT02011	None	None	G5T4Q	S4	WL
coast horned lizard *Phrynosoma blainvillii*	ARACF12100	None	None	G3G4	S3S4	SSC
Crotch bumble bee *Bombus crotchii*	IIHYM24480	None	Candidate Endangered	G3G4	S1S2	
fulvous whistling-duck *Dendrocygna bicolor*	ABNJB01010	None	None	G5	S1	SSC
giant gartersnake *Thamnophis gigas*	ARADB36150	Threatened	Threatened	G2	S2	
giant kangaroo rat *Dipodomys ingens*	AMAFD03080	Endangered	Endangered	G1G2	S1S2	
Great Valley Cottonwood Riparian Forest *Great Valley Cottonwood Riparian Forest*	CTT61410CA	None	None	G2	S2.1	
Great Valley Mesquite Scrub *Great Valley Mesquite Scrub*	CTT63420CA	None	None	G1	S1.1	
Hopping's blister beetle *Lytta hoppingi*	IICOL4C010	None	None	G1G2	S1S2	
Le Conte's thrasher *Toxostoma lecontei*	ABPBK06100	None	None	G4	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
least Bell's vireo *Vireo bellii pusillus*	ABPBW01114	Endangered	Endangered	G5T2	S2	
mountain plover *Charadrius montanus*	ABNNB03100	None	None	G3	S2S3	SSC
Nelson's antelope squirrel *Ammospermophilus nelsoni*	AMAFB04040	None	Threatened	G2	S2S3	
San Joaquin coachwhip *Masticophis flagellum ruddocki*	ARADB21021	None	None	G5T2T3	S2?	SSC
San Joaquin kit fox *Vulpes macrotis mutica*	AMAJA03041	Endangered	Threatened	G4T2	S2	
San Joaquin Pocket Mouse *Perognathus inornatus*	AMAFD01060	None	None	G2G3	S2S3	
short-nosed kangaroo rat *Dipodomys nitratoides brevinasus*	AMAFD03153	None	None	G3T1T2	S1S2	SSC
Swainson's hawk *Buteo swainsoni*	ABNKC19070	None	Threatened	G5	S3	
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	AMAFD03152	Endangered	Endangered	G3T1T2	S1S2	
tricolored blackbird *Agelaius tricolor*	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
Tulare grasshopper mouse *Onychomys torridus tularensis*	AMAFF06021	None	None	G5T1T2	S1S2	SSC
Valley Sacaton Grassland *Valley Sacaton Grassland*	CTT42120CA	None	None	G1	S1.1	
Valley Saltbush Scrub *Valley Saltbush Scrub*	CTT36220CA	None	None	G2	S2.1	
Valley Sink Scrub *Valley Sink Scrub*	CTT36210CA	None	None	G1	S1.1	
western mastiff bat *Eumops perotis californicus*	AMACD02011	None	None	G5T4	S3S4	SSC
western pond turtle *Emys marmorata*	ARAAD02030	None	None	G3G4	S3	SSC
western snowy plover *Charadrius alexandrinus nivosus*	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
western spadefoot *Spea hammondii*	AAABF02020	None	None	G3	S3	SSC
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
white-faced ibis *Plegadis chihi*	ABNGE02020	None	None	G5	S3S4	WL
white-tailed kite *Elanus leucurus*	ABNKC06010	None	None	G5	S3S4	FP

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
yellow-headed blackbird *Xanthocephalus xanthocephalus*	ABPBXB3010	None	None	G5	S3	SSC

Record Count: 38

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

23 matches found. *Click on scientific name for details*

Search Criteria

California Rare Plant Rank is one of [1A, 1B, 2A, 2B, 3, 4],
FESA is one of [Endangered, Threatened, Candidate, Not Listed],
CESA is one of [Endangered, Threatened, Rare, Not Listed], Found in Quads 3511944, 3511943, 3511934, 3511933, 3511942, 3511932, 3511922 3511923 and 3511924;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Astragalus hornii var. hornii	Horn's milk-vetch	Fabaceae	annual herb	May-Oct	1B.1	S1	G4G5T1T2
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G3T2
Atriplex cordulata var. erecticaulis	Earlimart orache	Chenopodiaceae	annual herb	Aug-Sep(Nov)	1B.2	S1	G3T1
Atriplex coronata var. coronata	crownscale	Chenopodiaceae	annual herb	Mar-Oct	4.2	S3	G4T3
Atriplex coronata var. vallicola	Lost Hills crownscale	Chenopodiaceae	annual herb	Apr-Sep	1B.2	S2	G4T2
Atriplex minuscula	lesser saltscale	Chenopodiaceae	annual herb	May-Oct	1B.1	S2	G2
Atriplex subtilis	subtle orache	Chenopodiaceae	annual herb	Jun,Aug,Sep(Oct)	1B.2	S1	G1
Azolla microphylla	Mexican mosquito fern	Azollaceae	annual / perennial herb	Aug	4.2	S4	G5
Calochortus striatus	alkali mariposa lily	Liliaceae	perennial bulbiferous herb	Apr-Jun	1B.2	S2S3	G3?
Caulanthus californicus	California jewelflower	Brassicaceae	annual herb	Feb-May	1B.1	S1	G1
Cirsium crassicaule	slough thistle	Asteraceae	annual / perennial herb	May-Aug	1B.1	S1	G1

Delphinium recurvatum	recurved larkspur	Ranunculaceae	perennial herb	Mar-Jun	1B.2	S2?	G2?
Eremalche parryi ssp. kernensis	Kern mallow	Malvaceae	annual herb	Jan,Mar,Apr,May (Feb)	1B.2	S3	G3G4T3
Eriastrum hooveri	Hoover's eriastrum	Polemoniaceae	annual herb	(Feb)Mar-Jul	4.2	S3	G3
Eriogonum gossypinum	cottony buckwheat	Polygonaceae	annual herb	Mar-Sep	4.2	S3S4	G3G4
Eschscholzia lemmonii ssp. kernensis	Tejon poppy	Papaveraceae	annual herb	(Feb)Mar-May	1B.1	S2	G5T2
Goodmania luteola	golden goodmania	Polygonaceae	annual herb	Apr-Aug	4.2	S3	G3
Hordeum intercedens	vernal barley	Poaceae	annual herb	Mar-Jun	3.2	S3S4	G3G4
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Asteraceae	annual herb	Feb-Jun	1B.1	S2	G4T2
Monolopia congdonii	San Joaquin woollythreads	Asteraceae	annual herb	(Jan)Feb-May	1B.2	S2	G2
Stylocline citroleum	oil neststraw	Asteraceae	annual herb	Mar-Apr	1B.1	S3	G3
Stylocline masonii	Mason's neststraw	Asteraceae	annual herb	Mar-May	1B.1	S1	G1
Trichostema ovatum	San Joaquin bluecurls	Lamiaceae	annual herb	Jul-Oct	4.2	S3	G3

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Appendix C

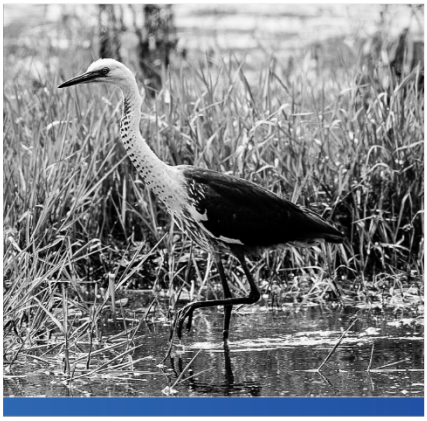
Ecosystem Benefits from Kern Fan Groundwater Storage Project – Cramer Fish Sciences

Kern Fan Groundwater Storage Project

FEASIBILITY REPORT

Appendix H: Ecosystem Benefit in the Delta Technical Report

October 21, 2019
Updated April 13, 2020



Irvine Ranch WATER DISTRICT

Rosedale-Rio Bravo WATER STORAGE DISTRICT

CRAMER FISH SCIENCES
An Employee Owned Consulting Company

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October 17th, 2019

TECHNICAL MEMORANDUM

Subject: Chinook Salmon, Steelhead and Green Sturgeon Benefits from Kern Fan Groundwater Storage Project

Prepared for: Irvine Ranch Water District

Prepared by: Brad Cavallo

This technical memorandum provides a description of background, methodology, assumptions and results for an assessment of anadromous fish benefits resulting from the Kern Fan Groundwater Storage Project (Project). Anadromous fish species evaluated included four endangered species, three occurring in the Feather River (Central Valley Spring-run Chinook, Central Valley Steelhead, and the Southern Distinct Population of Green Sturgeon) and one occurring only in the Sacramento River mainstem (Sacramento Winter-run Chinook).

1. Project operations for ecosystem benefits

Cramer Fish Sciences (CFS) consulted with MBK Engineers and Irvine Ranch Water District to recommend how 18 thousand acre-feet (TAF) of additional water supply made available by the proposed Project could be used to provide the greatest benefit to endangered anadromous fish species occurring in the Feather River. CFS recommended a pulse released from Lake Oroville in the month of April. CALSIM analysis provided by MBK Engineers indicated the Project could, with 1922-2003 hydrology under a 2030 future condition, provide for seven April flow pulses (of 18 TAF) in dry or critically dry years. Under a 2070 future condition, the Project can provide for five April flow pulses (of 18 TAF) in dry or critically dry years.

CFS recommended and assumed the 18TAF would be applied as a 3.75 day, 2,400cfs increase in Feather River flows released from the Thermalito Afterbay Outlet (TAO). Releasing this water from the TAO is important because the Feather River downstream of TAO has no ramping criteria for flows greater than 2,500 cfs (NMFS 2016a).

2. Methods for assessing anadromous fish benefits

2.1. Chinook salmon

Our quantitative analysis focuses on assessing benefits to outmigrating juvenile spring-run Chinook originating from the Feather River. Effects of the Feather River flow pulse downstream of the confluence with the Sacramento River and through the Delta were analyzed for Feather River origin spring-run Chinook, and also for Sacramento River basin juvenile spring-run Chinook and juvenile winter-run Chinook.

2.1.1. Feather River Analysis

The Feather River hosts natural and hatchery origin spring-run Chinook. NMFS considers both in-river and hatchery spawning Feather River spring-run Chinook salmon to be part of the listed CV spring-run Chinook salmon ESU (NMFS 2016b). NMFS, in their most recent five-year review of CV spring-run, assigned a recovery priority for spring-run Chinook salmon in the Feather River of 5 (with 1 being the highest priority, 12 being the lowest priority) (NMFS 2016b). These determinations are based upon the evolutionary legacy the Feather River spring-run stock represents, because the stock continues to exhibit a CV spring-run Chinook salmon migration timing, and because of habitat and management improvements required as part of the Oroville Facilities FERC Relicensing Settlement Agreement.

Name	Value	Description	Source
SmH	2 million	Annual spring-run hatchery smolts released at Gridley.	FRH Spring Chinook HGMP
SmN	2 million	Annual natural origin spring-run juvenile production reaching apprxoimately Gridley on the Feather River.	Natural origin spring-run Chinook are produced on the Feather River, but abundance is uncertain. This value is approximated based on likely in-river spawning coupled with expected enhancements identified in the FRH Spring Chinook HGMP and FERC Reclicensing Biological Opinion (NMFS 2016a)
MIGm	0.62	Fraction of natural smolts emigrating in April	NMFS (2016a)
MIGp	0.125	Fraction of days in month with flow pulse	Duration of flow pulse (3.75 days) divided by 30
rel_m	0.5	Fraction of FRH smolts released in April	FRH Spring Chinook HGMP
relf	0.5	Fraction of FRH smolt release which be coordinated to coincide with flow pulse	Jason Kindopp (CDWR), personal communication
B0	-2.1	Smolt survival in the Feather River (untransformed value)	See text
B1	1.47	Flow survival effect (untransformed value)	NMFS (2017), Table B1. See text for more details.
Qm	variable	Standardized Feather River flow by month	CALSIM output
SmS	3.2 million	Annual natural origin spring-run smolts from the Sacramento River basin excluding the Feather River basin (estimated from spawning escapement, fecundity, egg-fry survival data)	See Table 2
SmW	2.1 million	Annual winter-run smolts from the Sacramento River (estimated from spawning escapement, fecundity, egg-fry survival data)	See Table 2
Sa	0.0144	Mean survival rate for smolts to return as adults	Zeug et al. (2012). See text for more details.
Sa max	0.0192	Maximum survival rate for smolts to return as adults	Zeug et al. (2012). See text for more details.
Sa min	0.0096	Miimum survival rate for smolts to return as adults	Zeug et al. (2012). See text for more details.

Table 1. Values, descriptions and sources for inputs and parameters used for the quantification of Project ecosystem benefits.

There are two components of the Feather River spring-run Chinook salmon analysis: 1) smolts released by FRH, and 2) juvenile spring-run Chinook salmon naturally produced in the Feather River. FRH annually produces 2 million spring-run Chinook smolts released into the Feather River. Natural origin spring-run Chinook are certainly produced in the Feather River, but their abundance is currently unknown (NMFS 2016a). Given expected habitat enhancements of the Feather River and the requirement to segregate spring and fall-run in the immediate future (see NMFS 2016a), we conservatively assume an average of 2 million natural origin spring-run smolts will be produced naturally by the Feather River by the time the Project is completed. Additionally, we assume all FRH spring-run Chinook releases will occur at Gridley. Though future FRH release locations are unknown, the California Hatchery Scientific Review Group has recommended all hatchery production be released as close to the source hatchery as possible (CA HSRG 2012). Given this recommendation and concerns about straying Feather River Hatchery spring-run Chinook (see NMFS 2016a), future spring-run Chinook releases downstream of the Yuba River confluence (e.g. Boyd's Pump) are unlikely.

Other data and sources used to evaluate effects of the proposed Project on the survival of Feather River spring-run Chinook salmon are summarized in Table 1. Related source flow data and calculations are available upon request in an Excel spreadsheet "FR_analysis_v3".

The monthly number of FRH produced spring-run smolts entering the Sacramento River (Sm_{FRH}) from the Feather River is estimated by

(eq1) $$Sm_H * rel_m * relf * surv_m$$

and the monthly number of natural origin spring-run smolts entering the Sacramento River from the Feather River (Sm_{FRW})is estimated by

(eq2) $$Sm_N * MIG_m * MIG_p * surv_m.$$

Survival for both hatchery and natural origin smolts are modeled as a function of monthly Feather River flows

(eq3) $$logit(surv_m) = B0 + B1 * Q_m$$

where B0 and B1 are model parameters (Table 1), and where Q_m is monthly Feather River flows standardized relative to all monthly Feather River flow observations (provided by CALSIM). Monthly flow data (1922 through 2003) representing two future conditions (2030 and 2070) and two scenarios (Project and no project) were provided by MBK Engineers (see MBK 2018). A total of four different CALSIM scenarios were analyzed.

Data Type	*Sacramento Basin Spring-run*		*Winter-run*	
	Reference	**Data**	**Reference**	**Data**
Total In-river Escapement	GrandTab (March 2010), 10 yr Avg	8,924	GrandTab (March 2010), 10 yr Avg	7,634
Pre-spawning mortality	Garman & McReynolds 2005-08	5.53%	Poytress & Carillo 2010	5%
Percent Female	Garman & McReynolds 2005-08	55%	Killam 2009	54%
Fecundity	DWR 2009	5300	Poytress & Carillo 2010	3859
Egg to Fry Survival	Poytress & Carillo 2010	33%	Poytress & Carillo 2010	33%
Fry to Delta Survival	USFWS, unpublished data	53%	USFWS, unpublished data	53%
Total Juveniles Reaching Delta		**4,200,000**		**2,600,000**
Percent smolts entering delta	USFWS Sacramento Trawls	86%	USFWS Sacramento Trawls	82%
Total Smolts Reaching Delta		**3,600,000**		**2,100,000**

Table 2. Values, descriptions and data sources used to estimate average Sacramento River basin spring-run and winter-run Chinook smolt production reaching the Delta (i.e. inputs for the Delta Passage Model).

The flow survival relationship (eq3) was developed by the NMFS Southwest Fishery Science Center as part of a life cycle modeling effort for winter-run Chinook salmon (NMFS 2017). The NMFS LCM is under continuous development, but the model (including this flow-survival function) were used in the NMFS Biological Opinion for California Water Fix (http://www.westcoast.fisheries.noaa.gov/central_valley/CAWaterFix.html). Of course, survival differences between the Sacramento and the Feather River are likely to occur. To address these expected differences, we utilized available Feather River spring-run Chinook acoustic tagging data to estimate B0, but relied upon the estimate of B1 from NMFS (2017). Survival per river kilometer

data from Figure 2-30 (NMFS 2016a) were converted to a reach-specific survival estimate of 0.11, representing survival from Gridley to the confluence with the Sacramento River. Transforming 0.11 as necessary for the logit scale shown in eq3 yields a value of -2.1 for B0. The resulting relationship between Feather River flow and spring-run Chinook survival is depicted in Figure 1. Ideally, a Feather River flow-survival relationship would be based solely upon observations from the Feather River. However, since few observations of Feather River survival were available, we combined available Feather River information with findings from the NMFS winter-run Chinook life cycle modeling effort. Though there is uncertainty about the Feather River flow-survival relationship depicted in Figure 1, scientific literature from Central Valley tributaries affirms a positive relationship between Feather River flow and juvenile salmon survival is likely. Investigations into the relationship between river discharge and juvenile salmon survival in the Central Valley have primarily focused on the Sacramento-San Joaquin Delta and several studies have reported significant positive relationships (Newman 2003, Perry 2010). Less attention has been focused on the Feather River or other upstream tributaries. However, there are multiple lines of evidence to suggest a positive flow-survival relationship operates in the Feather River. Within the Central Valley, Zeug et al. (2014) reported a significant positive relationship between river discharge (and discharge variability) and survival for juvenile Chinook salmon in the Stanislaus River. Additionally, Perry et al. (2018) found that survival increased in Delta reaches when high levels of discharge resulted in a switch from bi-directional to unidirectional flow. A positive flow survival relationship for Chinook salmon during spring in the Snake River was reported by Smith et al. (2003). However, flow was correlated with turbidity and temperature complicating attempts to separate out effects. Regardless of the causal mechanism it is clear that increases in flow result in more favorable conditions for juvenile Chinook survival during migration.

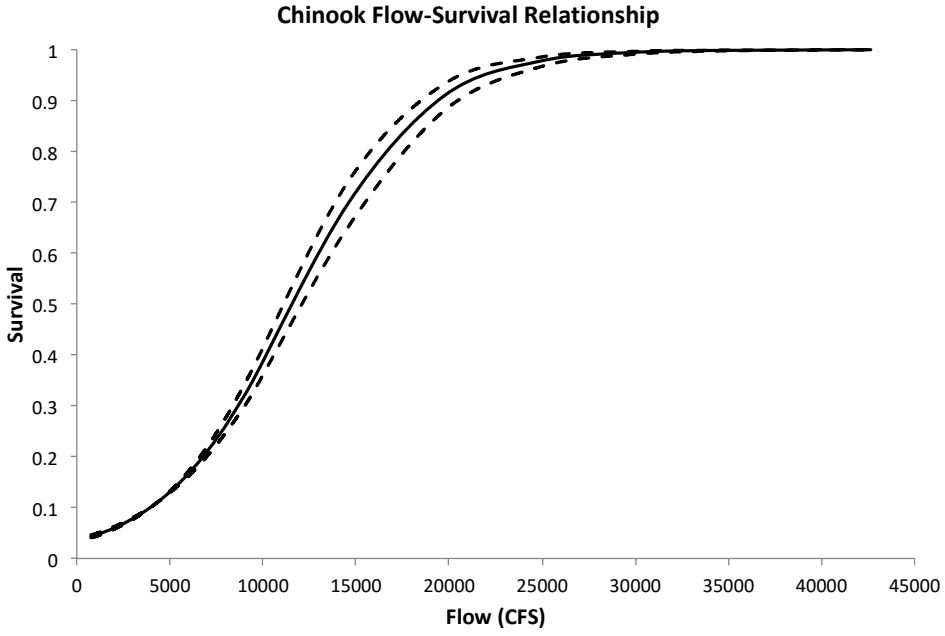


Figure 1. Estimated flow-survival relationship for juvenile Feather River spring-run Chinook salmon. Dashed lines indicate standard deviation associated with parameter B1 as estimated by NMFS (2017).

Flow pulses produced by the Project occurred exclusively in dry years, with Feather River base flows at less than 3,000cfs. The estimated survival under these conditions occurs at the left side of the curve depicted in Figure 1. On average, we estimate Project flow pulses improve survival relative to the base flow condition by approximately 4.6%

Date	Survvial w/o Pulse	Survvial w/ Pulse	Difference
04/30/1939	0.052	0.097	0.046
04/30/1944	0.060	0.112	0.052
04/30/1960	0.074	0.137	0.063
04/30/1976	0.046	0.088	0.042
04/30/1981	0.046	0.088	0.042
04/30/1985	0.046	0.088	0.042
04/30/1988	0.043	0.082	0.039
		Average:	**0.046**

Table 3. Estimated survival rates for Feather River Chinook salmon with and without the 2,400cfs flow pulse provided by the Project. Source data and calculations visible in the Excel spreadsheet "FR_analysis_v3".

2.1.2. Delta Analysis

Survival rates for Feather River spring-run Chinook, Sacramento River basin spring-run Chinook, and Sacramento River winter-run Chinook from Verona (Sacramento River) to San Francisco Bay were estimated for each flow scenario (with and without the proposed project) using the Delta Passage Model (DPM).

Sm_{FRH} and Sm_{FRW} provided inputs to the Delta Passage Model (DPM) representing Feather River Hatchery origin spring-run Chinook and Feather River natural origin spring-run Chinook, respectively. The number of spring-run (Sm_{SSRC}) and winter-run (Sm_{SWRC}) Chinook smolts entering from the Sacramento River basin are indicated in Table 2. DPM produced annual survival rates for winter and spring Chinook (weighted by monthly emigration timing) are shown in the Excel spreadsheet "Smolt_Surv_to_Bay_V2". A detailed description of the DPM is provided below.

The DPM simulates migration of Chinook salmon smolts entering the Sacramento River at Verona and estimates survival to Chipps Island. The DPM uses available time-series data and values taken from empirical studies or other sources to parameterize model relationships and inform uncertainty, thereby using the greatest amount of data available to dynamically simulate responses of smolt survival to changes in water management. Although the DPM is based primarily on studies of late fall–run Chinook salmon, it is applied here for winter-run and spring-run by adjusting emigration timing and assuming that all migrating Chinook salmon smolts will respond similarly to Delta conditions. The DPM results presented here reflect the current version of the model, which continues to be reviewed and refined, and for which a sensitivity analysis has been completed to examine various aspects of uncertainty related to the model's inputs and parameters.

Although studies have shown considerable variation in emigrant size, with Central Valley Chinook salmon migrating as fry, parr, or smolts (Brandes and McLain 2001; Williams 2001), the DPM relies predominantly on data from acoustic-tagging studies of large (>140 mm) smolts, and

therefore should be applied cautiously to pre-smolt migrants. Salmon juveniles less than 80 mm are more likely to exhibit rearing behavior in the Delta (Moyle 2002) and thus likely will be represented poorly by the DPM. It has been assumed that the downstream emigration of fry, when spawning grounds are well upstream, is probably a dispersal mechanism that helps distribute fry among suitable rearing habitats. However, even when rearing habitat does not appear to be a limiting factor, downstream movement of fry still may be observed, suggesting that fry emigration is a viable alternative life-history strategy (Healey 1980; Healey and Jordan 1982; Miller et al. 2010). Unfortunately, survival data are lacking for small (fry-sized) juvenile emigrants because of the difficulty of tagging such small individuals. Therefore, the DPM should be viewed as a smolt survival model only, with its survival relationships generally having been derived from larger smolts (>140 mm), with the fate of pre-smolt emigrants not incorporated into model results.
The DPM has undergone substantial revisions based on comments received through the preliminary proposal anadromous team meetings and in particular through feedback received during a workshop held on August 24, 2010, a 2-day workshop held June 23–24, 2011, and various meetings of a workgroup consisting of agency biologists and consultants. This comparison of survival among Project and baseline alternatives uses the most recent version of the DPM as of July 2015 with several additional modifications described below. The DPM is viewed as a simulation framework that can be changed as more data or new hypotheses regarding smolt migration and survival become available. The results are based on these revisions.
Survival and abundance estimates generated by the DPM are not intended to predict future observed survival. Instead, the DPM provides a simulation tool that compares the effects of different water management options on smolt migration survival, with accompanying estimates of uncertainty. The DPM was used to evaluate overall through-Delta survival for baseline and Project scenarios using CALSIM flow data as inputs for Sacramento River and Delta water conditions. The DPM produced annual survival rates weighted by monthly emigration timing for spring-run and winter-run Chinook salmon.

Model Overview

The DPM is based on a detailed accounting of migratory pathways and reach-specific mortality as Chinook salmon smolts travel through a simplified network of reaches and junctions (Figure 2). The biological functionality of the DPM is based on the foundation provided by Perry et al. (2010) as well as other acoustic tagging–based studies (San Joaquin River Group Authority 2008, 2010; Holbrook et al. 2009) and coded wire tag (CWT)–based studies (Newman and Brandes 2010; Newman 2008). Uncertainty is explicitly modeled in the DPM by incorporating environmental stochasticity and estimation error whenever available.
The major model functions in the DPM are as follows.

1. Delta Entry Timing, which models the temporal distribution of smolts entering the Sacramento River at Verona for each race of Chinook salmon.
2. Fish Behavior at Junctions, which models fish movement as they approach river junctions.
3. Migration Speed, which models reach-specific smolt migration speed and travel time.
4. Route-Specific Survival, which models route-specific survival response to non-flow factors.
5. Flow-Dependent Survival, which models reach-specific survival response to flow.
6. Export-Dependent Survival, which models survival response to water export levels in the Interior Delta reach.

Functional relationships are described in detail in the *Model Functions* section below.

Model Time Step

The DPM operates on a daily time step using simulated flow data and Delta exports as model inputs. The DPM does not attempt to represent sub-daily flows or diel salmon smolt behavior in response to the interaction of tides, flows, and specific channel features. The DPM is intended to represent the net outcome of migration and mortality occurring over one day, not three-dimensional movements occurring over minutes or hours (e.g., Blake and Horn 2003).

Spatial Framework

The DPM version used for this Project is composed of eight reaches and two junctions (Figure 2; Table 4) selected to represent primary salmonid migration corridors where high-quality data were available for fish and hydrodynamics. For simplification, Sutter Slough and Steamboat Slough are combined as the reach SS; and Georgiana Slough, the Delta Cross Channel (DCC), and the forks of the Mokelumne River to which the DCC leads are combined as Geo/DCC. The Geo/DCC reach can be entered by Sacramento Chinook salmon runs through the combined junction of Georgiana Slough and DCC (Junction C). The Interior Delta reach can only be entered from Geo/DCC. Because of the lack of data informing specific routes through the Interior Delta, or tributary-specific survival, the entire Interior Delta region is treated as a single model reach. The four distributary junctions (channel splits) depicted in the DPM are (A) Sacramento River at Fremont Weir (not used for this Project), (B) Sacramento River at head of Sutter and Steamboat Sloughs, (C) Sacramento River at the combined junction with Georgiana Slough and DCC, and (D) San Joaquin River at the head of Old River (not used for this Project). The proportion of fish entering Yolo was set to zero for this Project because the confluence of the Feather River is downstream of this junction. Additionally, survival was not estimated for San Joaquin or Mokelumne rivers because the proposed Project would not affect these systems.

Table 4. Description of Modeled Reaches and Junctions in the Delta Passage Model

Reach/ Junction	Description	Reach Length (km)
Sac1	Sacramento River from Freeport to junction with Sutter/Steamboat Sloughs	19.33
Sac2	Sacramento River from Sutter/Steamboat Sloughs junction to junction with Delta Cross Channel/Georgiana Slough	10.78
Sac3	Sacramento River from Delta Cross Channel junction to Rio Vista, California	22.37
Sac4	Sacramento River from Rio Vista, California to Chipps Island	23.98
Verona	Fremont Weir to Freeport	57
SS	Combined reach of Sutter Slough and Steamboat Slough ending at Rio Vista, California	26.72
Geo/DCC	Combined reach of Georgiana Slough, Delta Cross Channel, and South and North Forks of the Mokelumne River ending at confluence with the San Joaquin River in the Interior Delta	25.59
Interior Delta	Begins at end of reach Geo/DCC, San Joaquin River via Junction D, or Old River via Junction D, and ends at Chipps Island	NA[a]
B	Combined junction of Sutter Slough and Steamboat Slough with the Sacramento River	NA

Reach/ Junction	Description	Reach Length (km)
C	Combined junction of the Delta Cross Channel and Georgiana Slough with the Sacramento River	NA
[a] Reach length for the Interior Delta is undefined because salmon can take multiple pathways. Also, timing through the Interior Delta does not affect Delta survival because there are no Delta reaches located downstream of the Interior Delta.		

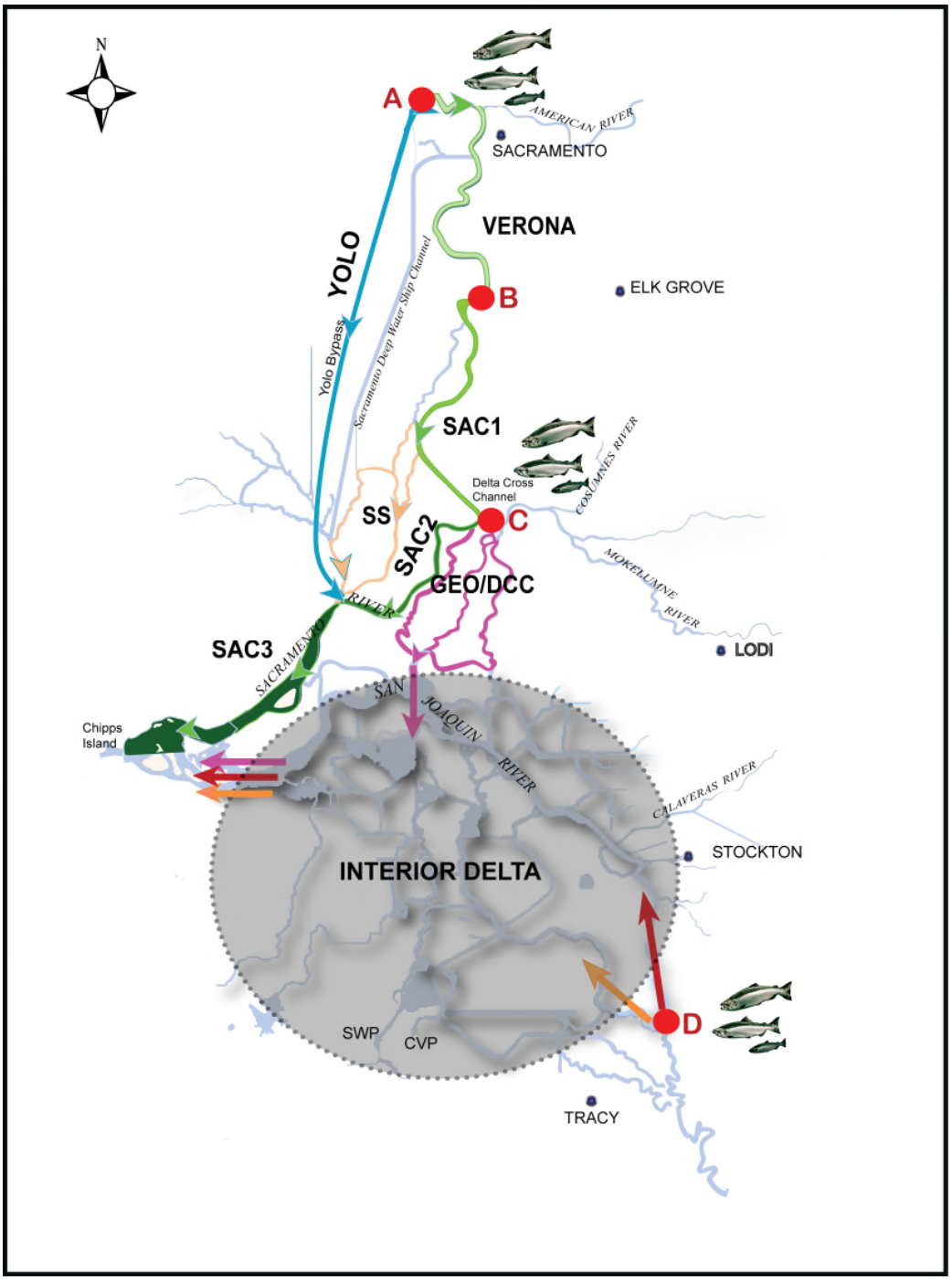


Figure 2. Map of the Sacramento–San Joaquin River Delta Showing the Modeled Reaches and Junctions of the Delta applied in the Delta Passage Model. Bold headings label modeled reaches, and red circles indicate model junctions. Salmonid icons indicate locations where smolts enter the Delta in the DPM. The Yolo reach and junction was not included in this analysis. Smolts enter the Interior Delta from the Geo/DCC reach or from Junction D via Old River or from the San Joaquin River. The San Joaquin and Mokelumne rivers were not modeled in the current Project because the proposed Project would not affect flow in those systems. Because of the lack of data informing specific routes through the Interior Delta, and tributary-specific survival, the entire Interior Delta region is treated as a single model reach.

Flow Input Data

Water movement through the Delta as input to the DPM is derived from monthly (tidally averaged) flow output produced by CALSIM-II. The nodes in CALSIM II that were used to provide flow for specific reaches in the DPM are shown in Table 5.

Table 5. Delta Passage Model Reaches and Associated Output Locations from CALSIM II.

DPM Reach or Model Component	CALSIM Node
Sac1	C169
Sac2	C400
Sac3	C401A
Sac4	C402A
Verona	NA
SS	-1811.574+(Sac1*0.3608831)
Geo/DCC	C401B
South Delta Export Flow	Delta Exports

Model Functions

Delta Entry Timing

Recent sampling data on Delta entry timing of emigrating juvenile smolts for three Central Valley Chinook salmon runs were used to inform the daily proportion of juveniles entering the Delta for each run (Table 6). Because the DPM models the survival of smolt-sized juvenile salmon, pre-smolts were removed from catch data before creating entry timing distributions. The lower 95th percentile of the range of salmon fork lengths visually identified as smolts by the USFWS in Sacramento trawls was used to determine the lower length cutoff for smolts. A lower fork length cutoff of 70 mm for smolts was applied, and all catch data of fish smaller than 70 mm were eliminated. To isolate wild production, all fish identified as having an adipose-fin clip (hatchery production) were eliminated, recognizing that most of the fall-run hatchery fish released upstream of Sacramento are not marked. Daily catch data for each brood year were divided by total annual catch to determine the daily proportion of smolts entering the Delta for each brood year. Sampling was not conducted daily at most stations and catch was not expanded for fish caught but not measured. Finally, the daily proportions for all brood years were plotted for each race, and a normal distribution was visually approximated to obtain the daily proportion of smolts entering the DPM for each run (Figure 3). Because a bi-modal distribution appeared evident for winter-run entry timing, a generic probability density function was fit to the winter-run daily proportion data using the package "sm" in R software (R Core Team 2012). The R fitting procedure estimated the best-fit probability distribution of the daily proportion of fish entering the DPM for

winter-run. Timing of Delta entry was backed up to Verona for each run based on estimates of travel time in the reach between Verona and Sacramento calculated from acoustic tag data (Michel 2010).

Table 6. Sampling Gear Used to Create Juvenile Delta Entry Timing Distributions for Each Central Valley Run of Chinook Salmon

Chinook Salmon Run	Gear	Agency	Brood Years
Sacramento River Winter Run	Trawls at Sacramento	USFWS	1995–2009
Sacramento River Spring Run	Trawls at Sacramento	USFWS	1995–2005
Sacramento River Fall Run	Trawls at Sacramento	USFWS	1995–2005

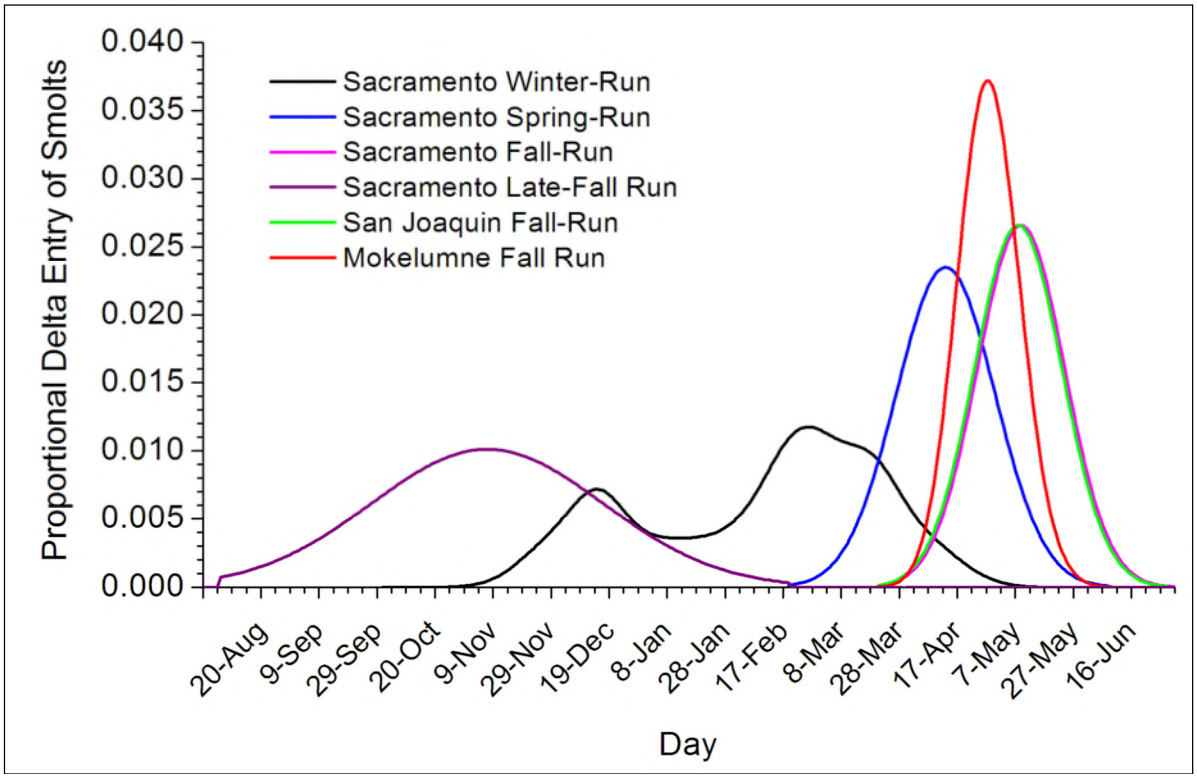


Figure 3. Delta Entry Distributions for Chinook Salmon Smolts Applied in the Delta Passage Model for Sacramento River Winter-Run, Sacramento River Spring-Run, Sacramento River Fall-Run, Sacramento River Late Fall–Run, San Joaquin River Fall-Run, and Mokelumne River Fall-Run Chinook Salmon. For this Project, only spring-winter and fall run in the Sacramento River were modeled.

Migration Speed

The DPM assumes a net daily movement of smolts in the downstream direction. The rate of smolt movement in the DPM affects the timing of arrival at Delta junctions and reaches, which can affect route selection and survival as flow conditions or water project operations change.

Smolt movement in all reaches except the Interior Delta is a function of reach-specific length and migration speed as observed from acoustic-tagging results. Reach-specific length (kilometers

[km]) (Table 4) is divided by reach migration speed (km/day) the day smolts enter the reach to calculate the number of days smolts will take to travel through the reach.

For north Delta reaches Verona, Sac1, Sac2, SS, and Geo/DCC, mean migration speed through the reach is predicted as a function of flow. Many studies have found a positive relationship between juvenile Chinook salmon migration rate and flow in the Columbia River Basin (Raymond 1968; Berggren and Filardo 1993; Schreck et al. 1994), with Berggren and Filardo (1993) finding a logarithmic relationship for Snake River yearling Chinook salmon. Ordinary least squares regression was used to test for a logarithmic relationship between reach-specific migration speed (km/day) and average daily reach-specific flow (cubic meters per second [m^3/sec]) for the first day smolts entered a particular reach for reaches where acoustic-tagging data was available (Sac1, Sac2, Sac3, Sac4, Geo/DCC, and SS):

$$Speed = \beta_0 \ln(flow) + \beta_1;$$

Where β_0 is the slope parameter and β_1 is the intercept.

Individual smolt reach-specific travel times were calculated from detection histories of releases of acoustically-tagged smolts conducted in December and January for three consecutive winters (2006/2007, 2007/2008, and 2008/2009) (Perry 2010). Reach-specific migration speed (km/day) for each smolt was calculated by dividing reach length by travel days (Table 7). Flow data was queried from the DWR's California Data Exchange website (<http://cdec.water.ca.gov/>).

Table 7. Reach-Specific Migration Speed and Sample Size of Acoustically-Tagged Smolts Released during December and January for Three Consecutive Winters (2006/2007, 2007/2008, and 2008/2009)

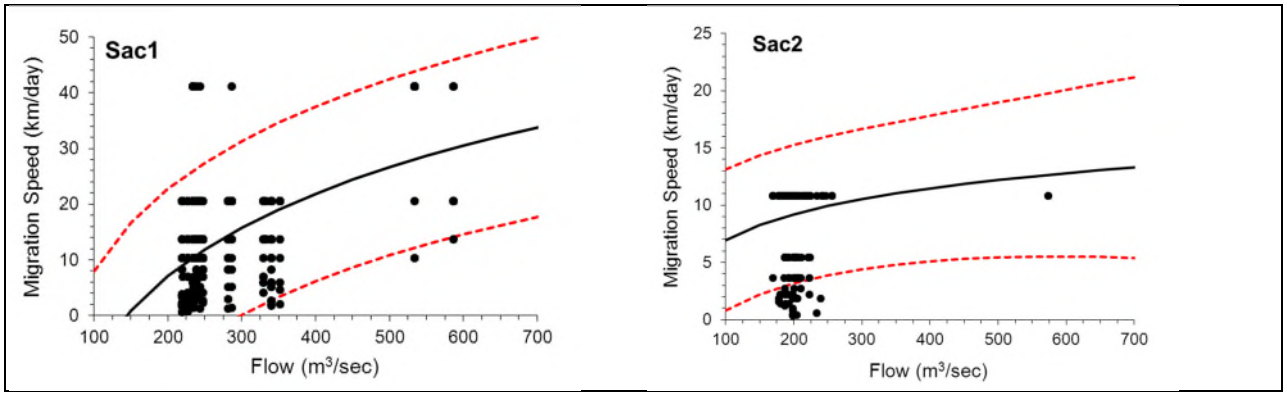
Reach	Gauging Station ID	Release Dates	Sample Size	Speed (km/day)			
				Avg	Min	Max	SD
Sac1	FPT	12/05/06–12/06/06, 1/17/07–1/18/07, 12/04/07–12/07/07, 1/15/08–1/18/08, 11/30/08–12/06/08, 1/13/09–1/19/09	452	13.32	0.54	41.04	9.29
Sac2	SDC	1/17/07–1/18/07, 1/15/08–1/18/08, 11/30/08–12/06/08, 1/13/09–1/19/09	294	9.29	0.34	10.78	3.09
Sac3	GES	12/05/06–12/06/06, 1/17/07–1/18/07, 12/04/07–12/07/07, 1/15/08–1/18/08, 11/30/08–12/06/08, 1/13/09–1/19/09	102	9.24	0.37	22.37	7.33
Sac4	GES[a]	12/05/06–12/06/06, 1/17/07–1/18/07, 12/04/07–12/07/07, 1/15/08–1/18/08, 11/30/08–12/06/08, 1/13/09–1/19/09	62	8.60	0.36	23.98	6.79

Reach	Gauging Station ID	Release Dates	Sample Size	Speed (km/day)			
				Avg	Min	Max	SD
Geo/DCC	GSS	12/05/06–12/06/06, 1/17/07–1/18/07, 12/04/07–12/07/07, 1/15/08–1/18/08, 11/30/08–12/06/08, 1/13/09–1/19/09	86	14.20	0.34	25.59	8.66
SS	FPT-SDC[b]	12/05/06–12/06/06, 12/04/07–12/07/07, 1/15/08–1/18/08, 11/30/08–12/06/08, 1/13/09–1/19/09	30	9.41	0.56	26.72	7.42
[a] Sac3 flow is used for Sac4 because no flow gauging station is available for Sac4. [b] SS flow is calculated by subtracting Sac2 flow (SDC) from Sac1 flow (FPT).							

Migration speed was significantly related to flow for reaches Sac1 (df = 450, F = 164.36, P < 0.001), Sac2 (df = 292, F = 4.17, P = 0.042), and Geo/DCC (df = 84, F = 13.74, P <0.001). Migration speed increased as flow increased for all three reaches (Figure 4). Therefore, for reaches Sac1, Sac2, and Geo/DCC, the regression coefficients shown in Table 8 are used to calculate the expected average migration rate given the input flow for the reach and the associated standard error of the regressions is used to inform a normal probability distribution that is sampled from the day smolts enter the reach to determine their migration speed throughout the reach. The minimum migration speed for each reach is set at the minimum reach-specific migration speed observed from the acoustic-tagging data (Table 7). The flow-migration rate relationship that was used for Sac1 also was applied for the Verona reach.

Table 8. Sample Size and Slope (β0) and Intercept (β1) Parameter Estimates with Associated Standard Error (in Parenthesis) for the Relationship between Migration Speed and Flow for Reaches Sac1, Sac2, and Geo/DCC.

Reach	N	β_0	β_1
Sac1	452	21.34 (1.66)	-105.98 (9.31)
Sac2	294	3.25 (1.59)	-8.00 (8.46)
Geo/DCC	86	11.08 (2.99)	-33.52 (12.90)



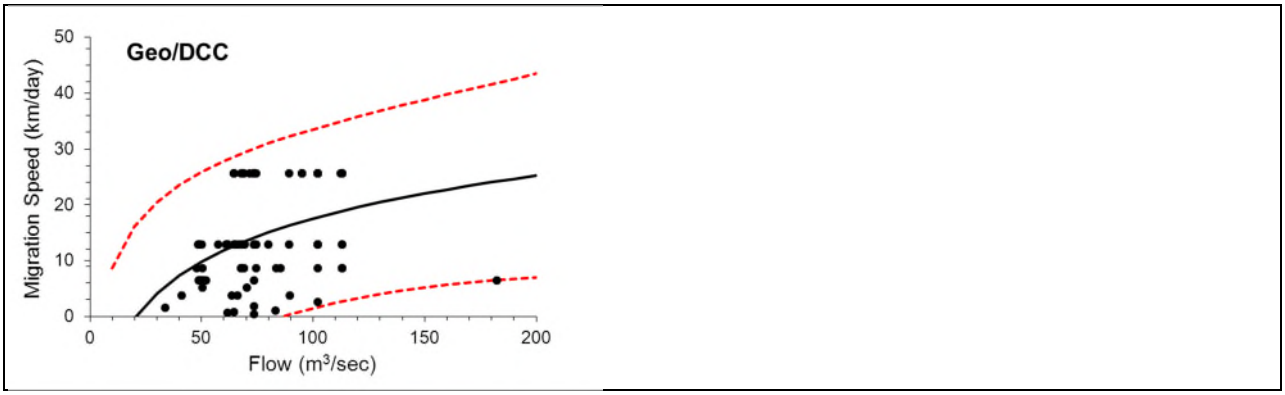


Figure 4. Reach-Specific Migration Speed (km/day) as a Function of Flow (m3/sec) Applied in Reaches Sac1, Sac2, and Geo/DCC. Circles are observed migration speeds of acoustically-tagged smolts from acoustic-tagging studies from Perry (2010), solid lines are predicted mean reach survival curves, and dotted lines are 95% prediction intervals used to inform uncertainty.

No significant relationship between migration speed and flow was found for reaches Sac3 (df = 100, F = 1.13, P =0.29), Sac4 (df = 60, F = 0.33, P = 0.57), and SS (df = 28, F = 0.86, P = 0.36). Therefore, for these reaches the observed mean migration speed and associated standard deviation (Table 7) is used to inform a normal probability distribution that is sampled from the day smolts enter the reach to determine their migration speed throughout the reach. As applied for reaches Sac1, Sac2, and Geo/DCC, the minimum migration speed for reaches Sac3, Sac4, and SS is set at the minimum reach-specific migration speed observed from the acoustic-tagging data (Table 7).

The travel time of smolts migrating through the Interior Delta in the DPM is informed by observed mean travel time (7.95 days) and associated standard deviation (6.74) from North Delta acoustic-tagging studies (Perry 2010). However, the timing of smolt passage through the Interior Delta does not affect Delta survival because there are no Delta reaches located downstream of the Interior Delta.

Fish Behavior at Junctions (Channel Splits)
Perry et al. (2010) found that acoustically-tagged smolts arriving at Delta junctions exhibited inconsistent movement patterns in relation to the flow being diverted. For Junction B (Sacramento River-Sutter/Steamboat Sloughs), Perry et al. (2010) found that smolts consistently entered downstream reaches in proportion to the flow being diverted. Therefore, smolts arriving at Junction B in the model move proportionally with flow. For Junction C (Sacramento River–Georgiana Slough/DCC), Perry (2010) found a linear, nonproportional relationship between flow and fish movement. His relationship for Junction C was applied in the DPM:

$$y = 0.22 + 0.47x;$$

where y is the proportion of fish diverted into Geo/DCC and x is the proportion of flow diverted into Geo/DCC (Figure 5).

In the DPM, this linear function is applied to predict the daily proportion of fish movement into Geo/DCC as a function of the proportion of flow into Geo/DCC.

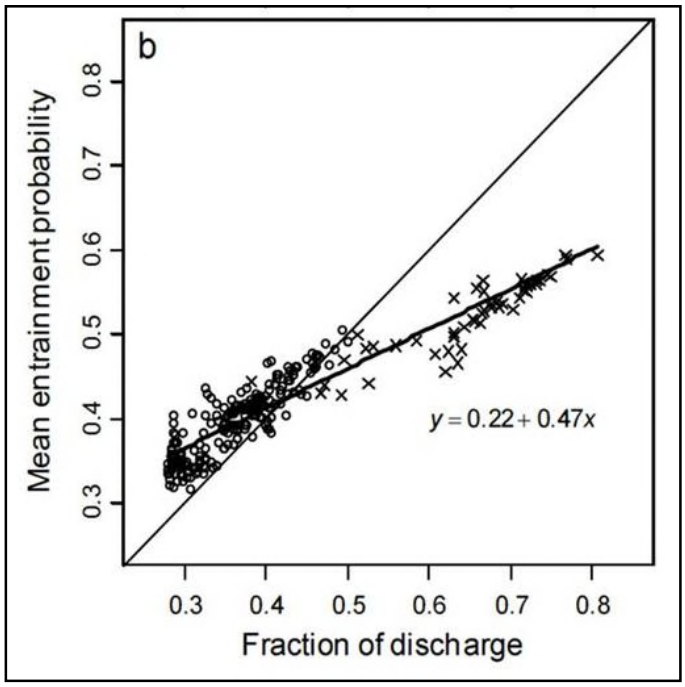


Figure 5. Figure from Perry (2010) Depicting the Mean Entrainment Probability (Proportion of Fish Being Diverted into Reach Geo/DCC) as a Function of Fraction of Discharge (Proportion of Flow Entering Reach Geo/DCC). Circles Depict DCC Gates Closed, Crosses Depict DCC Gates Open.

Route-Specific Survival

Survival through a given route (individual reach or several reaches combined) is calculated and applied the first day smolts enter the reach. For reaches where literature showed support for reach-level responses to environmental variables, survival is influenced by flow (Sac1, Sac2, Sac3 and Sac4 combined, SS and Sac 4 combined, Interior Delta via San Joaquin River, and Interior Delta via Old River) or south Delta water exports (Interior Delta via Geo/DCC). For these reaches, daily flow or exports occurring the day of reach entry are used to predict reach survival during the entire migration period through the reach (Table 9). For Geo/DCC, reach survival is assumed to be unaffected by Delta conditions and is informed by the mean and standard deviation of survival from acoustic-tagging studies.

Table 9. Route-Specific Survival and Parameters Defining Functional Relationships or Probability Distributions for Each Chinook Salmon Run and Methods Section Where Relationship is Described.

Route	Chinook Salmon Run	Survival	Methods Section Description
Verona	All Sacramento runs	0.931 (0.02)	This section
Sac1	All Sacramento runs	Function of flow	Flow-Dependent Survival
Sac2	All Sacramento runs	Function of flow	Flow-Dependent Survival

Sac3 and Sac4 combined	All Sacramento runs	Function of flow	Flow-Dependent Survival
SS and Sac4 combined	All Sacramento runs	Function of flow	Flow-Dependent Survival
Geo/DCC	All Sacramento runs	0.65 (0.126)	This section
Interior Delta	All Sacramento runs	Function of exports	Export-Dependent Survival

For reach Geo/DCC, no empirical data were available to support a relationship between survival and Delta flow conditions (channel flow, exports). Therefore, for these reaches mean reach survival is used along with reach-specific standard deviation to define a normal probability distribution that is sampled from when smolts enter the reach to determine reach survival (Table 9).

Mean reach survival and associated standard deviation for Geo/DCC are informed by survival data from smolt acoustic-tagging studies from Perry (2010). Smolts migrating down the Sacramento River during the acoustic-tagging studies could enter the DCC or Georgiana Slough when the DCC was open (December releases), therefore, group survivals for both routes are used to inform the mean survival and associated standard deviation for the Geo/DCC reach for Sacramento River runs (Table 10).

Mean survival and associated standard deviation for the Verona reach between Fremont Weir and Yolo Bypass were derived from the 2007–2009 acoustic-tag study reported by Michel (2010), who did not find a flow-survival relationship for that reach.

Table 10. Individual Release-Group Survival Estimates, Release Dates, Data Sources, and Associated Calculations Used to Inform Reach-Specific Mean Survivals and Standard Deviations Used in the Delta Passage Model for Reaches Where Survival Is Uninfluenced by Delta Conditions.

DPM Reach	Survival	Release Dates	Survival Calculation	Mean	Standard Deviation
Geo/DCC via Sacramento River	0.648	12/05/06	S_{D1}	0.559	0.194
	0.600	12/04/07–12/06/07	$S_{D1,SAC}*S_{D2}$		
	0.762	1/15/08–1/17/08	$S_{D1,SAC}*S_{D2}$		
	0.774	11/31/08–12/06/08	$S_{D1,SAC}*S_{D2}$		
	0.467	1/13/08–1/19/09	$S_{D1,SAC}*S_{D2}$		
	0.648	12/05/06	$S_{C1}* S_{C2}$		
	0.286	12/04/07–12/06/07	S_{C1}		
	0.286	11/31/08–12/06/08	S_{C1}		

DPM Reach	Survival	Release Dates	Survival Calculation	Mean	Standard Deviation
Source: Perry 2010.					

Flow-Dependent Survival

For reaches Sac1, Sac2, Sac3 and Sac4 combined and SS and Sac4 combined, flow values on the day of route entry are used to predict route survival. Perry (2010) evaluated the relationship between survival among acoustically-tagged Sacramento River smolts and Sacramento River flow measured below Georgiana Slough (DPM reach Sac3) and found a significant relationship between survival and flow during the migration period for smolts that migrated through Sutter and Steamboat Sloughs to Chipps Island (Sutter and Steamboat route; SS and Sac4 combined) and smolts that migrated from the junction with Georgiana Slough to Chipps Island (Sacramento River route; Sac3 and Sac4 combined). Therefore, for route Sac3 and Sac4 combined and route SS and Sac4 combined, the logit survival function from Perry (2010) was used to predict mean reach survival (*S*) from reach flow (*flow*):

$$S = \frac{e^{(\beta_0 + \beta_1 flow)}}{1 + e^{(\beta_0 + \beta_1 flow)}}$$

where β_0 (SS and Sac4 = -0.175, Sac3 and Sac4 = -0.121) is the reach coefficient and β_1 (0.26) is the flow coefficient, and *flow* is average Sacramento River flow in reach Sac3 during the experiment standardized to a mean of 0 and standard deviation of 1.

Perry (2010) estimated the global flow coefficient for the Sutter Steamboat route and Sacramento River route as 0.52. For the Sac3 and Sac4 combined route and the SS and Sac4 combined route, mean survival and associated standard error predicted from each flow-survival relationship is used to inform a normal probability distribution that is sampled from the day smolts enter the route to determine their route survival.

With a flow-survival relationship appearing evident for group survival data of acoustically-tagged smolts in reaches Sac1 and Sac2, Perry's (2010) relationship was applied to Sac1 and Sac2 while adjusting for the mean reach-specific survivals for Sac1 and Sac2 observed during the acoustic-tagging studies (Figure 6; Table 11). The flow coefficient was held constant at 0.52 and the residual sum of squares of the logit model was minimized about the observed Sac1 and Sac2 group survivals, respectively, while varying the reach coefficient. The resulting reach coefficients for Sac1 and Sac2 were 1.27 and 2.16, respectively. Mean survival and associated standard error predicted from the flow-survival relationship is used to inform a normal probability distribution that is sampled from the day smolts enter the reach to determining Sac1 and Sac2 reach survival.

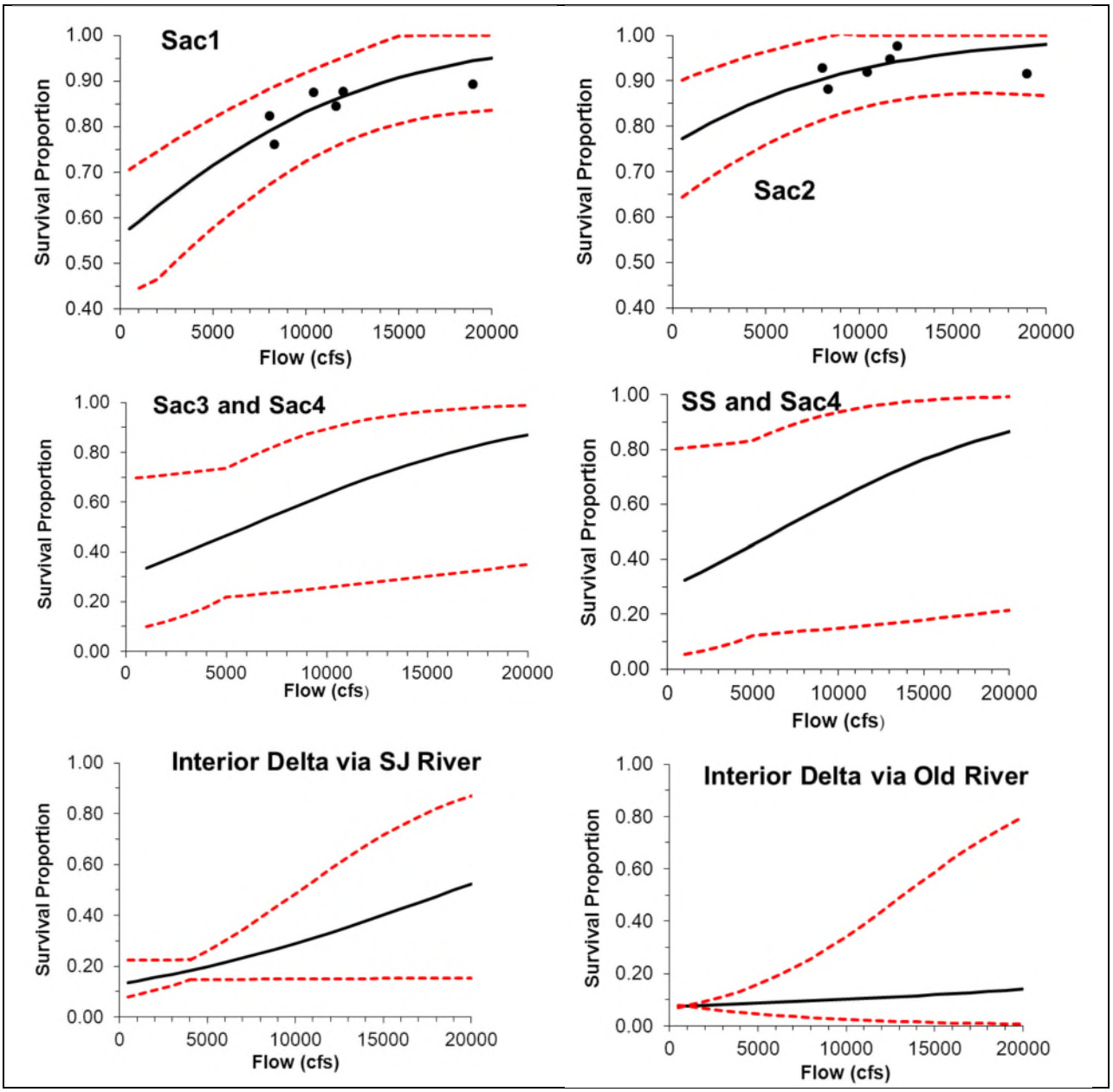


Figure 6. Route Survival as a Function of Flow Applied in Reaches Sac1, Sac2, Sac3 and Sac4 combined, SS and Sac4 combined, Interior Delta via the San Joaquin River, and Interior Delta via Old River For Sac1, Sac2, Sac3, and Sac4, circles are observed group survivals from acoustic-tagging studies from Perry (2010). Raw data are not available from Newman (2010) for Interior Delta via San Joaquin River and Interior Delta via Old River from Newman (2010). Solid lines are predicted mean route survival curves, and dotted lines are 95% confidence bands used to inform uncertainty. Survival of smolts through the Interior Delta via the San Joaquin and Old River were not modeled in the current Project.

Table 11. Group Survival Estimates of Acoustically-Tagged Chinook Salmon Smolts from Perry (2010) and Associated Calculations Used to Inform Flow-Dependent Survival Relationships for Reaches Sac1 and Sac2.

DPM Reach	Survival	Release Dates	Source	Survival Calculation
Sac1	0.844	12/5/06	Perry 2010	S_{A1} *S_{A2}
Sac1	0.876	1/17/07	Perry 2010	S_{A1} *S_{A2}
Sac1	0.874	12/4/07-12/6/07	Perry 2010	S_{A1} *S_{A2}
Sac1	0.892	1/15/08-1/17/08	Perry 2010	S_{A1} *S_{A2}

Sac1	0.822	11/31/08-12/06/08	Perry 2010	$S_{A1} * S_{A2}$
Sac1	0.760	1/13/09-1/19/09	Perry 2010	$S_{A1} * S_{A2}$
Sac2	0.947	12/5/06	Perry 2010	S_{A3}
Sac2	0.976	1/17/07	Perry 2010	S_{A3}
Sac2	0.919	12/4/07-12/6/07	Perry 2010	S_{A3}
Sac2	0.915	1/15/08-1/17/08	Perry 2010	S_{A3}
Sac2	0.928	11/31/08-12/06/08	Perry 2010	S_{A3}
Sac2	0.881	1/13/09-1/19/09	Perry 2010	S_{A3}

Exports are standardized as described for flow. Uncertainty in these parameters is accounted for by using model-averaged estimates for the intercept, flow coefficient and export coefficient. The model-averaged estimates and their standard deviations are used to define a normal probability distribution that is resampled each day in the model. San Joaquin River flows downstream of the head of Old River that were modeled by Newman (2010) ranged from -49 cfs to 10,756 cfs, with a median of 3,180 cfs. Exports modeled by Newman (2010) ranged from 805 cfs to 10,295 cfs, with a median of 2,238 cfs.

Export-Dependent Survival

As migratory juvenile salmon enter the Interior Delta from Geo/DCC for Sacramento races they transition to an area strongly influenced by tides and where south Delta water exports may influence survival. The export–survival relationship described by Newman and Brandes (2010) was applied as follows:

$$\theta = 0.5948 * e^{(-0.000065 * Total\_Exports)}$$

where θ is the ratio of survival between coded wire tagged smolts released into Georgiana Slough and smolts released into the Sacramento River and Total_Exports is the flow of water (cfs) pumped from the Delta from the State and Federal facilities.

θ is a ratio and ranges from just under 0.6 at zero south Delta exports to ~0.27 at 12,000-cfs south Delta exports (Figure 7).

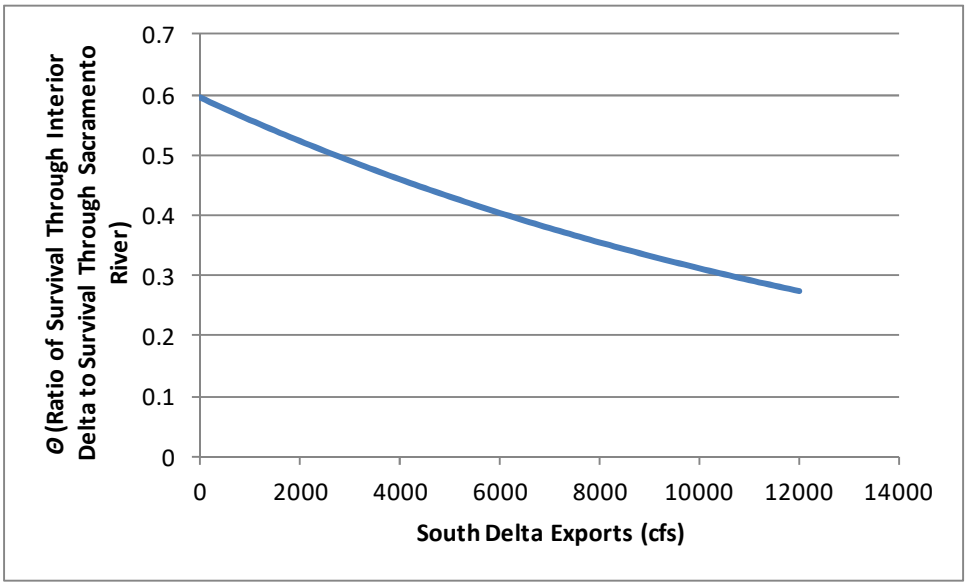


Figure 7. Relationship between θ (Ratio of Survival through the Interior Delta to Survival through Sacramento River) and South Delta Export Flows. Source: Newman and Brandes 2010.

θ was converted from a ratio into a value of survival through the Interior Delta using the equation:

$$S_{ID} = \frac{\theta}{S_{Geo/DCC}} * (S_{Sac3} * S_{Sac4})$$

;

where S_{ID} is survival through the Interior Delta, θ is the ratio of survival between Georgiana Slough and Sacramento River smolt releases, $S_{Geo/DCC}$ is the survival of smolts in the Georgiana Slough/Delta Cross Channel reach, $S_{Sac3} * S_{Sac4}$ is the combined survival in reaches Sac 3 and Sac 4 (Figure 8).

Uncertainty is represented in this relationship by using the estimated value of θ and the standard error of the equation to define a normal distribution bounded by the 95% prediction interval of the model that is then re-sampled each day to determine the value of θ.

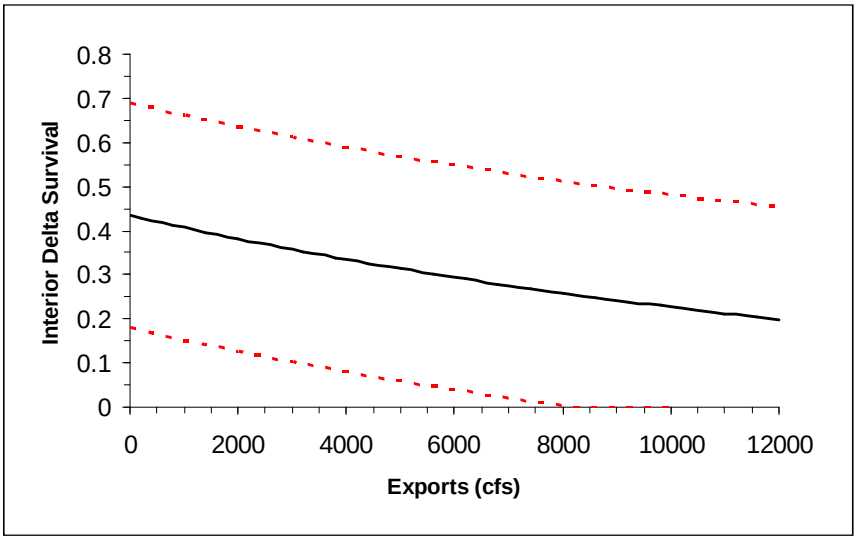


Figure 8. Interior Delta Survival as a Function of Delta Exports (Newman and Brandes 2010) as Applied for Sacramento Races of Chinook Salmon Smolts Migrating through the Interior Delta via Reach Geo/DCCSurvival values in reaches Sac3, Sac4, and Geo/DCC were held at mean values observed during acoustic-tag studies (Perry 2010) to depict export effect on Interior Delta survival in this plot. Dashed lines are 95% prediction bands used to inform uncertainty in the relationship.

2.1.3. Bay Smolt to Adult Return Analysis

Total annual adult returns of spring-run Chinook salmon were calculated as

$$(Sm_{FRH}+Sm_{FRW}+Sm_{SSRC})*S_{DPM\_SRC} * S_a$$

and total annual adult returns of winter-run Chinook salmon were calculated as

$$Sm_{SWRC}*S_{DPM\_WRC} * S_a$$

Where…
S_{DPM_SRC} is the DPM-based estimate of survival for spring-run Chinook smolts to Delta exit;

S_{DPM_WRC} is the DPM-based estimate of survival for winter-run Chinook smolts to Delta exit; and where S_a is survival rate for smolts exiting the Delta to return as adults.

As discussed by Zeug et al. (2012), O'Farrell et al. (2012), Winship et al. (2014), Araujo et al. (2015), and others, smolt to adult survival is a function of factors including age and year specific natural mortality, age and year specific harvest mortality, and age at maturity. Since variation in these factors would not be influenced by the Project, we simplified by assuming all salmon matured at age-3 and that no harvest occurred until age-3. With these assumptions, smolt to adult mortality (S_a) was calculated as

$$M_2 * M_W * H_3$$

where M_2 is the survival of smolts to age-2, where M_w is overwinter survival of age-2 fish and where H_3 represents the fraction of fish surviving harvest and returning to spawn. Based upon Zeug et al. (2012) we fixed parameter values at 0.64 for M_w and at 0.75 for H_3. Since smolt to adult mortality is known to vary widely from year-to-year and among salmon populations (see Bradford et al. 1995), consistent with Zeug et al. (2012) we allowed M_2 to vary from a mean of 0.03, to a maximum value of 0.04 and to a minimum value of 0.02. The resulting range of values for S_a are shown in Table 2 and also reflected in the summary of results shown in Table 12. The estimated range for S_a are consistent with findings reported by Bradford et al. (1995), Araujo et al. (2015), Winship et al. (2014), O'Farrell et al. (2012), and are therefore considered appropriate for their application to evaluating the proposed Project.

2.2. Green sturgeon

Green sturgeon are a species of ancient fish, highly adapted to benthic environments. Though primarily marine oriented (including bays, estuaries and near coastal environments), adult green sturgeon enter freshwater to spawn. Green sturgeon migrate to freshwater spawning habitats in March-April and spawn from April through June (NMFS 2016). Green sturgeon are broken into two distinct population segments (DPSs): a northern DPS (nDPS) and a southern DPS (sDPS). Currently only the sDPS is listed under the Federal Endangered Species Act. In its 2006 final rule listing the sDPS green sturgeon as threatened, the National Marine Fisheries Services (NMFS) identified the loss of historical spawning habitat restricting spawning to a single river (the Sacramento) as a primary factor in the decline of the species.

Information on the abundance of Green Sturgeon in Central Rivers is limited. Available data suggest an average of 364 adult fish spawn in the Sacramento River, while 25 or fewer sDPS green sturgeon utilize the Feather River each year (NMFS 2016). Under current conditions, spawning in the Feather River is infrequent and consists of few fish relative to the Sacramento River. About Feather River green sturgeon, NMFS (2016) states:

> *"…we can tentatively say that the Feather River accounts for perhaps 2 to 9 percent of the sDPS green sturgeon population. While these numbers may seem low and perhaps insignificant, it is important to realize that the Feather River is highly valuable from a sDPS green sturgeon conservation perspective because the Feather River is the **only** place outside the Sacramento River where sDPS green sturgeon spawning has been documented, giving the Feather River a prominent role in the recovery of the species."*

The magnitude, duration and frequency of river flow during adult immigration and spawning is thought to be a key constraint on spawning success and adult abundance. On the Sacramento River, spring flow pulses are thought to be necessary for successful immigration and spawning (NMFS 2016). According to NMFS, the number of green sturgeon in the Feather River is likely dependent on flow and associated passage conditions. Green sturgeon in the Feather River are currently exposed to a simplified hydrograph that curtails flows in favor of reservoir storage during spring months. High spring flows associated with the natural hydrograph do not occur within the sections of the Feather River expected to be used by sDPS green sturgeon for spawning.

Flows can also be important for successful upstream passage. The Sunset Pumps diversion is thought to delay or block upstream passage during dry or critically dry water year types. DWR green sturgeon scientists have indicated flows ranging from 2,500 to 3,000cfs would be needed for adult sDPS green sturgeon passage at Sunset Pumps. The Feather River also provides an essential migration corridor for sDPS green sturgeon to access the Yuba River. Thus, Feather River spring flows can influence the migration of sDPS in both the Feather and Yuba Rivers.

Suitable water temperatures and spawning substrates are also important for successful spawning for sDPS green sturgeon. The NMFS indicates the Feather River provides 164,500 m^2 of deep pool habitat likely suitable for spawning. Similarly, water temperatures within potential spawning areas are optimal during the majority of the spawning and early rearing period (NMFS 2016). Thus, the absence of spring flow pulses is thought to be a key factor limiting green sturgeon in the Feather River.

2.2.1. Green Sturgeon Analysis

Spring flow pulse benefits to sDPS green sturgeon are difficult to quantify because empirical evidence specific to the Feather River is lacking. We therefore base our analysis upon observations available for sDPS green sturgeon on the Sacramento River. Specifically, we assume:

1. With a spring flow regime that effectively ameliorates passage problems and allows for successful immigration and spawning, the Feather River, like the Sacramento River, would support an average annual spawning population of 364 adult green sturgeon.
2. Base flows in the lower Feather River in April during dry or critically dry years will be 1,000 cfs (i.e. minimum required flows).

3. A two-week April flow pulse consisting of an additional 1,500 cfs (providing a total river flow of 2,500 cfs) in dry or critically dry years will be necessary (along with appropriate flows in other water year types) to achieve an average annual spawner abundance of 364 adult sDPS green sturgeon in the Feather River.
4. Providing an additional 1,500 cfs for two weeks requires 42 TAF of water to be released from the Oroville Facilities.
5. The annualized benefit to the sDPS green sturgeon population due to the spring flow pulse in (3) would be determined by the recurrence interval of the flow pulse. For example, a flow pulse that occurred in 1 out of every 10 years, would be credited for 10% of population benefit; an additional 36 adult green sturgeon for each year.
6. The annualized benefit to green sturgeon from (5) would be attributed to the Project based on the proportional contribution of the Project to the 42 TAF of water required for the flow pulse. Since the Project will yield 18 TAF toward each flow pulse, this value if 0.43.

2.3. Steelhead

Feather River natural and hatchery produced steelhead are designated as part of the California Central Valley (CCV) Distinct Population Segment (NMFS 2016b). Though natural origin CCV streelhead smolts occur in the Feather River, information on their abundance and emigration timing is highly uncertain (NMFS 2016b). In contrast, annual production of steelhead smolts by Feather River Hatchery (FRH) is well understood. FRH annually releases roughly 450,000 yearling CCV steelhead. FRH steelhead are released into the Feather River in late winter/early spring. For purposes of this analysis we assume all FRH steelhead releases will occur at Boyd's Pump. Boyd's pump is appropriate because it is a commonly used release site, and because it is the only Feather River location where releases have been intensively studied via acoustic tagging. Though future FRH release locations are unknown, the California Hatchery Scientific Review Group has recommended all hatchery production be released as close to the source hatchery as possible (CA HSRG 2012). Boyd's pump would appear the most downstream location that may satisfy CA HSRG recommendations. If future releases are instead made at locations upstream of Boyd's Pump, then this analysis would be underestimating (rather than overestimating) survival benefits associated with a flow pulse.

2.3.1. Feather River through Delta Analysis

Data and sources used to evaluate effects of the proposed Project on the survival of Feather River steelhead are summarized in Table 12. Related source flow data and calculations are available upon request in the Excel spreadsheet "FR_analysis_steelhead".

Table 32. Values, descriptions and sources for inputs and parameters used for the quantification of Project ecosystem benefits.

Name	Value	Description	Source
St_{FRH}	450,000	Annual FRH steelhead production.	NMFS 2016(a)
relf	0.25	Fraction of FRH steelhead smolts expected to be coordinated to coincide with flow pulse	NA
B0	-0.85	FRH steelhead survival to the Golden Gate (log base e scale)	See text
B1	1.47	Flow survival effect (log base e scale)	NMFS (2017), Table B1. See text for more details.
Qm	variable	Standardized Feather River flow by month	CALSIM output
Sa	0.0144	Mean survival rate for smolts to return as adults	Zeug et al. (2012). See text for more details.
Sa max	0.0192	Maximum survival rate for smolts to return as adults	Zeug et al. (2012). See text for more details.
Sa min	0.0096	Miimum survival rate for smolts to return as adults	Zeug et al. (2012). See text for more details.

The annual number of FRH steelhead smolts reaching the Golden Gate Bridge entering the (St_B) is estimated by

(eq4) $$St_{FRH} * relf * surv_m$$

where survival for hatchery steelhead ($surv_m$) is modeled as a function of monthly Feather River flows

(eq5) $$logit(surv_m) = B0 + B1 * Q_m$$

where B0 and B1 are model parameters (Table 1), and where Q_m is monthly Feather River flows standardized relative to all monthly Feather River flow observations (provided by CALSIM). Monthly flow data (1922 through 2003) representing two future conditions (2030 and 2070) and two scenarios (Project and no project) were provided by MBK Engineers (see MBK 2018). A total of four different CALSIM scenarios were analyzed.

The flow survival relationship (eq4) was developed by the NMFS Southwest Fishery Science Center as part of a life cycle modeling effort for winter-run Chinook salmon (NMFS 2017). The NMFS LCM is under continuous development, but the model (including this flow-survival function) were used in the NMFS Biological Opinion for California Water Fix (http://www.westcoast.fisheries.noaa.gov/central_valley/CAWaterFix.html). Of course, survival differences between the Sacramento-Feather Rivers and between winter-run Chinook and steelhead are expected. To address these expected differences, we utilized available steelhead acoustic tagging data to estimate B0, but relied upon the estimate of B1 from NMFS (2017). We utilized FRH steelhead survival estimates provided by Kurth and Hampton (2017) who estimated an average survival rate of 0.30 from Boyd's Pump to Verona (Feather River confluence with the Sacramento River). Zeug et al. (2016) estimated survival of 0.45 for acoustically tagged hatchery steelhead smolts from the Sacramento River to the Golden Gate Bridge. The combined survival for these two reaches is 0.13 (i.e. 0.30*0.45) representing survival from Boyd's Pump on the Feather River to ocean entry at the Golden Gate Bridge. Transforming 0.13 as necessary for the logit scale shown in eq2 yields a value of -0.85 for B0 (see Table 12). The resulting relationship between Feather River flow and steelhead survival is depicted in Figure 9. It is important to note that this relationship assumes the Feather River flow pulse provides benefits in both the Sacramento and Feather River, but also does not credit (or discount) the effects of Sacramento River flow changes-effectively assuming Sacramento River flows during FRH steelhead emigration are effectively neutral between Project and Non-Project conditions. CALSIM results reported by MBK indicate this is a reasonable assumption. The Delta Passage Model (DPM) was used to assess Delta effects

for spring-run and winter-run Chinook salmon, but was not used for steelhead because of insufficient information from Delta acoustic tagging studies for this species.

Ideally, a Feather River flow-survival relationship would be based solely upon observations from the Feather River. However, since few observations of Feather River survival were available, we combined available Feather River information with findings from the NMFS winter-run Chinook life cycle modeling effort. Though there is uncertainty about the Feather River flow-survival relationship depicted in Figure 9, scientific literature Central Valley tributaries affirms a positive relationship between Feather River flow and juvenile salmon survival is likely. Investigations into the relationship between river discharge and juvenile salmon survival in the Central Valley have primarily focused on the Sacramento-San Joaquin Delta and several studies have reported significant positive relationships (Newman 2003, Perry 2010). Less attention has been focused on the Feather River or other upstream tributaries. However, there are multiple lines of evidence to suggest a positive flow-survival relationship operates in the Feather River. Within the Central Valley, Zeug et al. (2014) reported a significant positive relationship between river discharge (and discharge variability) and survival for juvenile Chinook salmon in the Stanislaus River. Additionally, Perry et al. (2018) found that survival increased in delta reaches when high levels of discharge resulted in a switch from bi-directional to unidirectional flow. A positive flow survival relationship for Chinook salmon during spring in the Snake River was reported by Smith et al. (2003). However, flow was correlated with turbidity and temperature complicating attempts to separate out effects. Regardless of the causal mechanism it is clear that increases in flow result in more favorable conditions for juvenile Chinook survival during migration.

Flow pulses produced by the Project occurred exclusively in dry years, with Feather River base flows at less than 3,000cfs. The estimated survival under these conditions occurs at the left side of the curve depicted in Figure 9.

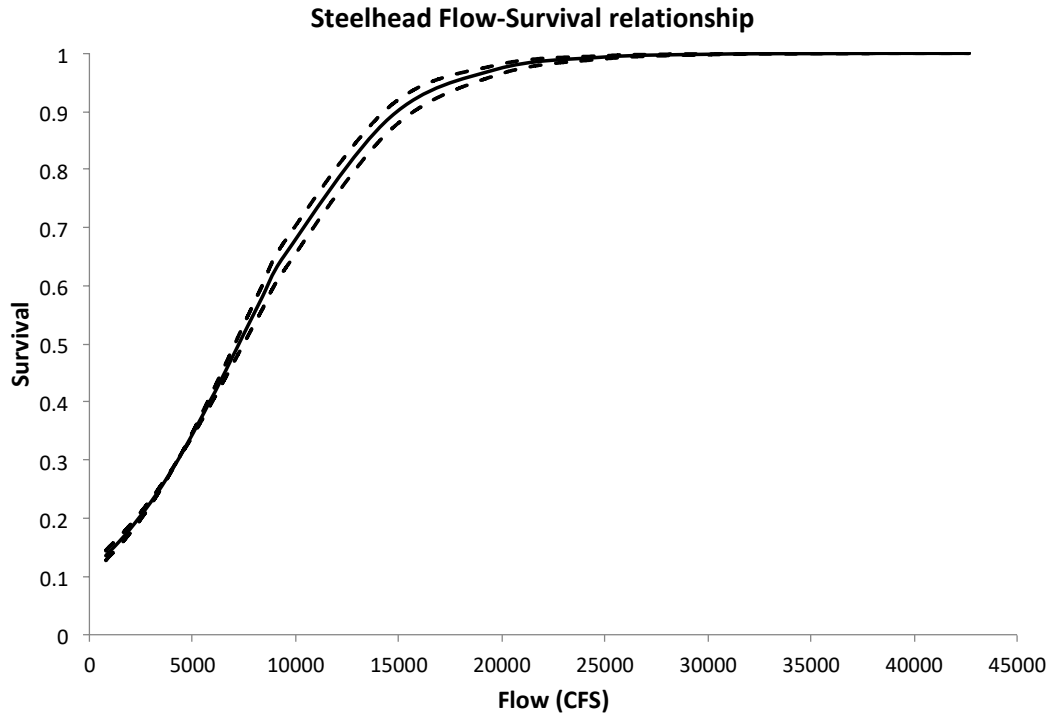


Figure 9. Estimated flow-survival relationship for juvenile Feather River Hatchery steelhead. Plotted flows are for the Feather River only- Sacramento River flows are not included in this relationship. Dashed lines indicate standard deviation associated with parameter B1 as estimated by NMFS (2017).

2.3.2. Bay Smolt to Adult Return Analysis

Total annual adult returns of steelhead were calculated as

$$St_B * S_a$$

where S_a is survival rate for steelhead smolts from Bay exit to return as adults.

Survival probabilities for smolts returning to freshwater as adults are relatively well understood for Chinook salmon (see Zeug et al. 2012, Araujo et al. 2015, Winship et al. 2014, O'Farrell et al. 2012), but are less documented for steelhead. Unlike salmon, steelhead are iteroparous spawners and exhibit other complex life histories which complicate estimation of survival from ocean entry to adult return. Given the lack of steelhead specific estimates, we rely upon available Chinook salmon information.

For Chinook salmon, smolt to adult survival is a function of factors including age and year specific natural mortality, age and year specific harvest mortality, and age at maturity. Since variation in these factors would not be influenced by the Project, we simplified by assuming all steelhead matured at age-3 and that no harvest occurred until age-3. With these assumptions, smolt to adult mortality (S_a) was calculated as

$$M_2 * M_W * H_3$$

where M_2 is the survival of smolts to age-2, where M_w is overwinter survival of age-2 fish and where H_3 represents the fraction of fish surviving harvest and returning to spawn. Based upon Zeug et al. (2012) we fixed parameter values at 0.64 for M_w and at 0.75 for H_3. Since smolt to adult mortality is known to vary widely from year-to-year and among salmon populations (see Bradford et al. 1995), consistent with Zeug et al. (2012) we allowed M_2 to vary from a mean of 0.03, to a maximum value of 0.04 and to a minimum value of 0.02. The resulting range of values for S_a are shown in Table 12 and also reflected in the summary of results shown in Table 14.

3. Results from quantifying anadromous fish benefits

3.1. Chinook results

Using simulated flows and water project operations, our analysis shows substantial net benefits to spring-run and winter-run Chinook (Table 13). The range of estimates shown in Table 13 demonstrated the influence of parameter uncertainty on estimated benefits. Though the magnitude of benefits are variable, our quantitative analyses demonstrates a consistent, strongly positive effect on adult abundance for spring-run and winter-run Chinook salmon.

Table 13. Estimated net change in adult Chinook salmon resulting from 50 years of proposed Project operations under four future conditions relative to no project.

	Spring-run		Winter-run	
Future Condition	Mean	Range	Mean	Range
2030	1011	(674-1348)	109	(73-145)
2070	715	(476-953)	73	(48-97)

As expected, benefits for Chinook salmon occur in years when the Project allows for a Feather River flow pulse. In most years, Chinook salmon are not affected positively or negatively by the Project. For spring-run Chinook, years with flow pulses produce 121 to 354 additional adult Chinook from each of the seven Project flow pulses occurring in the 2030 future condition (Figure 10). The 2070 future condition allowed for five Project flow pulses producing from 168 to 375 additional spring-run adults for each flow pulse event (Figure 10).

Reductions in estimated annual adult Chinook occur in some years as a result of increased Delta diversions associated with the Project, but these losses are outweighed by much larger benefits which accumulate across all years (Table 13).

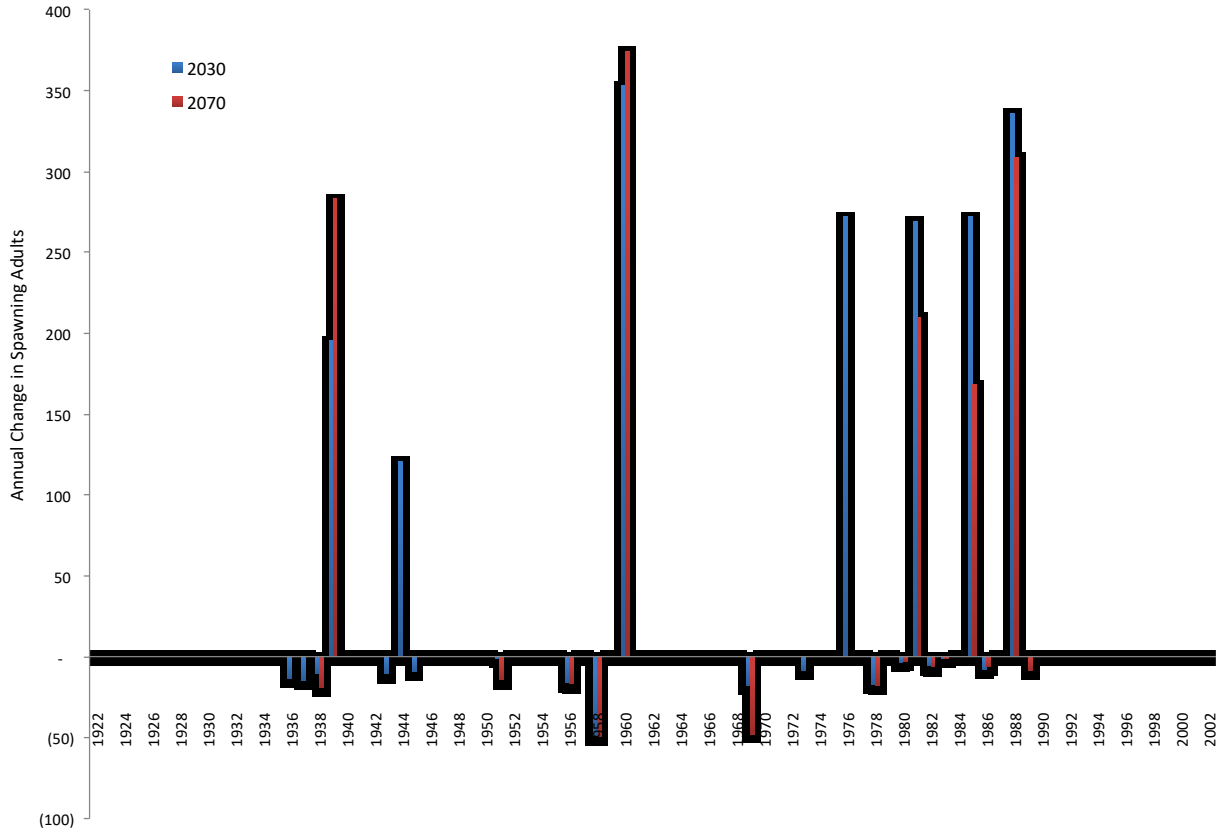


Figure 10. Annual change in adult spring-run Chinook spawners returns associated with the under 2030 and 2070 future conditions.

Benefits from the Project are also apparent for winter-run Chinook salmon. Though winter-run Chinook salmon are not present in the Feather River, the flow pulse originating from the Feather River reaches the Sacramento River and provides benefits from Verona to Delta exit. In most

years, winter-run Chinook salmon are not affected positively or negatively by the Project. Benefits ranging from 26 to 57 additional adult Chinook winter-run occur with the seven Project flow pulses associated with the 2030 condition, and with the five Project flow pulses for the 2070 condition (Figure 11). Most winter-run Chinook smolts emigrate through Delta prior to April and are thus are sometimes exposed to increased winter exports associated with the Project. As with spring-run Chinook, Delta losses for winter-run Chinook occur but are outweighed by larger benefits which accumulate across all years (Table 13).

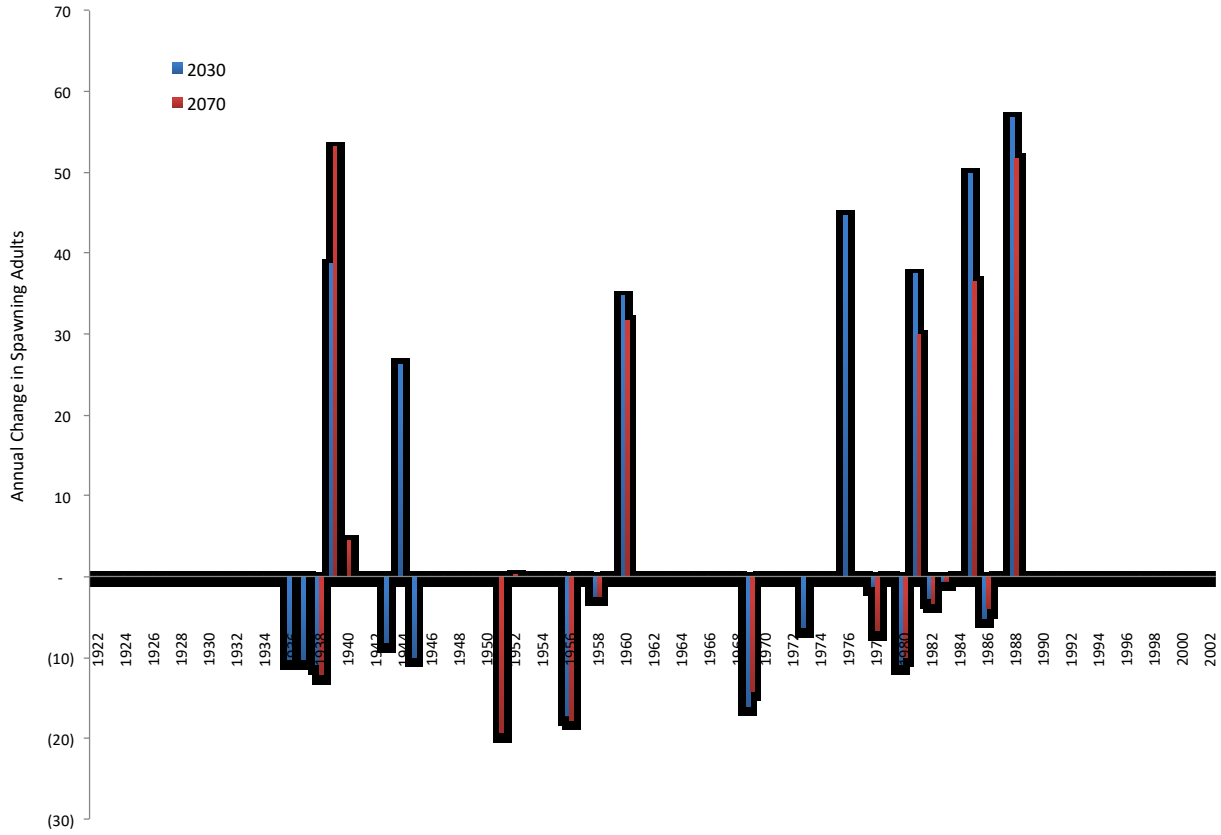


Figure 11. Annual change in adult winter-run Chinook spawning returns associated with the Project under 2030 and 2070 future conditions.

It is important to note that these abundance estimates do not represent a prediction of future spawning escapements. Rather these results reflect a comparison between water project operations using historic hydrologic conditions. The DPM and smolt-to-adult survival (S_a) components of the model analysis represent some major sources of uncertainty, but no practical modeling effort can adequately represent future real-world variation introduced by factors such as changing climate, changing habitat, changing harvest management, changing hatchery management, and shifting ocean productivity. Our modeling application here is consistent with other analytical efforts providing a standardized basis for comparing outcomes between alternative water management while controlling for unknown or uncontrollable future variation in environmental conditions.

3.2. Green sturgeon results

Using simulated flows and water project operations, our analysis shows benefits to green sturgeon abunance. Under the 2030 future condition, April flow pulses with a recurrence interval of once every twelve years are expected. Using the methods described previously, the annualized benefit from this flow pulse attributable to the Project would be approximately 13 additional adult green sturgeon per year.

Under the 2070 future condition, April flow pulses with a recurrence interval of once every sixteen years are expected. Using the methods described previously, the annualized benefit from this flow pulse attributable to the Project would be approximately 10 additional adult green sturgeon per year.

3.3. Steelhead results

Using simulated flows and water project operations, our analysis shows a substantnial net benefits to Central Valley steelhead (Table 14). The range of estimates shown in Table 14 demonstrate the influence of parameter uncertainty on estimated benefits. Though the magnitude of benefits are variable, our quantitative analyses demonstrates a consistent, positive effect on adult abundance of the CCV steelhead DSP.

Table 14. Estimated net change in adult CCV steelhead resulting from 50 years of proposed Project operations under four future conditions relative to no project.

Change in Adult Steelhead Abundance from 50 years with Project

Future Condition	Mean	Range
2030	95	(63-127)
2070	62	(42-83)

It is important to note that these abundance estimates do not represent a prediction of future steelhead spawning abundance. Rather, these results reflect a comparison between water project operations using historic hydrologic conditions. The smolt-to-adult survival (S_a) component of the model analysis represent some major sources of uncertainty, but no practical modeling effort can adequately represent future real-world variation introduced by factors such as changing climate, changing habitat, changing harvest management, changing hatchery management, and shifting ocean productivity. Our modeling application here is consistent with other analytical efforts providing a standardized basis for comparing outcomes between alternative water management while controlling for unknown or uncontrollable future variation in environmental conditions.

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Appendix D

Recharge Basin Design and Operation for Intermittent Wetland Benefits

Addendum No. 2

Recharge Basin Design and Operation for Intermittent Wetland Benefits

Finding #4:

Feasibility Study:

a. *As currently designed the recharge basins may not meet the requirements for classification as an intermittent wetland.*
b. *Determine requirements for creation of intermittent wetlands, and update design and cost estimate to include these features.*

Response to Finding #4:

- The wetlands that will be incidentally created by the constructed recharge basins will most closely resemble a classification of *Intermittent Flooded Riverine Wetlands with Unconsolidated Sandy Bottoms*.
- The Project will create incidental intermittent during recharge for periods of upward to 12 months. Specific features are incorporated into the design, operation and maintenance of the wetlands, so that during the recharge periods hydric soils conditions will form allowing for the development of hydrophytes and the establishment of habitat for shorebirds and migratory birds.
- Project recharge basins will typically hold water from 1 month upwards to 12 months which allow for the development of hydric soils during the growing season. Hydric soils typically form within existing recharge basins by the third or fourth week of flooding due to gradual saturation of the soils.
- Project berm and island banks will be built at a 4:1 slope with a minimum 1.5' freeboard which will result in at least a 6 to 10-foot-wide vegetative strip above the water line with vegetation extending into shallow water areas.
- Recharge basins will be designed to provide bird habitat in the intermittent wetlands created in the Project recharge ponds. Per the recommendation of the Environmental Defense Fund, recharge basins will be constructed at multiple water depths to benefit both shorebirds and waterfowl. Shorebirds prefer mudflats to a depth of up to 6" with sparse vegetation (<40%) while waterfowl prefer depths of 6" to above 18" with a combination of open water and wetland cover. Dry land (berms or islands) are important for resting areas with dense vegetation.
- The project costs include the design features for the intermittent wetlands such as dry land berms or islands and raptor boxes. The costs for dry land berms or islands are included in the line item for levee embankment fill. The costs for raptor boxes are included in the interbasin structure line item for miscellaneous steel and weir boards.
- The operations and maintenance costs associated with these design features have already been anticipated and therefore does not result in any changes to the project operations cost estimates.

More detailed information is provided below.

Wetland Classifications

The United States Fish and Wildlife Service maintains important documents related to the classification of wetlands in the United States. The most current is the Second Edition – Classification of Wetlands and

Deepwater Habitats of the United States[1]. Based on this document, wetlands are classified as Marine, Estuarine, Riverine, Lacustrine, and Palustrine. A Riverine System has four subsystems: Tidal, Lower Perennial, Upper Perennial, and Intermittent. Wetland classes are further defined based on bottom substrate and flooding regime as well as dominant vegetation types.

Project Recharge Basins as Intermittent Wetlands

Since the Project recharge basins will be intermittently flooded with captured stream flows that are diverted into the California Aqueduct, through the Project canal and into man-made impoundments, the wetlands that will be incidentally created by the constructed recharge basins will most closely resemble a classification of *Intermittent Flooded Riverine Wetlands with Unconsolidated Sandy Bottoms*. Accordingly, the recharge basins constructed for the Project will be designed to meet intermittent wetland requirements during recharge operations. The following explains the application of design criteria used to meet the project goals of establishing intermittent wetlands and providing bird habitat in the recharge basins.

As described in the Project Feasibility Report (Sections 1.4.3, 2.1.3, 4.1.4.2 and 5.1.3.2), the Project will establish intermittent wetland habitat through intermittent recharge events. The primary purpose of the Project lands is to construct and operated recharge basins that allow water to infiltrate and recharge into the underlying aquifer for storage until it is needed. During the years that the Project takes and recharges water into storage, the basins will be inundated with water and will provide intermittent wetland habitat to support waterfowl, shorebirds, raptors and other migratory birds along the Pacific Flyway. The wetlands to be established by the Project are considered intermittent because the water supply delivered for recharge may not be available for recharge year-round or during periods of drought. The term "incidental" is also used to describe these intermittent wetlands because they are incidentally created as a result of water recharging in the Project basins.

In addition to Rosedale-Rio Bravo Water Storage District (RRBWSD) and Irvine Ranch Water District's (IRWD) existing recharge basins, which support similar intermittent wetland habitat, the Kern Water Bank, located south of the Project, represents a larger reference site for the future conditions of the Project recharge basins and the intermittent wetland establishment. The Kern Water Bank spans 20,000 acres of water recharge and recovery infrastructure. Their recharge basins were established and are operated and managed as a habitat matrix of upland and intermittent wetland habitat. Through 2018, over 206 species of birds have been identified on Kern Water Bank lands (Kern Water Bank Authority 2019). It is anticipated that the Project will result in similar habitat conditions as established through the existing RRBWSD and IRWD basins and within the Kern Water Bank.

[1] Wetlands Subcommittee of the Federal Geographic Data Committee, August 2013. "Classification of Wetland and Deepwater habitats for the United States", Adapted from Cowardin, Carter, Golet and LaRoe (1979). Available at: https://www.fws.gov/wetlands/data/wetland-codes.html

Intermittent Wetland Requirements

Project recharge basin design and operation will align with the ecological requirements of intermittent wetlands. Intermittent wetland ecological features include:

(1) The intermittent presence of water at the surface or within the root zone;
(2) Saturated soil conditions that result in anaerobic conditions in the upper part (i.e., hydric soil);
(3) Water tolerant (i.e., hydrophytic) vegetation; and
(4) Establishing habitat for waterfowl and shorebirds.

For intermittent wetlands, the presence of water is variable and spans a variety of wetland types. For example, vernal pools, pond or lake fringes, and seasonal riverine wetlands are all considered intermittent wetlands.

Recharge Basin Design and Operation Criteria to Create Intermittent Wetlands

The design, construction and operation of the Project recharge basins fulfill the requirements of Intermittent Wetlands described above. Since the Project recharge basins will be intermittently flooded with captured stream flows diverted into the California Aqueduct, through the Project canal and into man-made impoundments, the wetlands that will be incidentally formed by the constructed recharge basins will be intermittent wetlands. The Project recharge basins include design features that will function as intermittent wetlands to support and benefit water birds and wetland-dependent upland birds and wildlife. The variable presence of water, soil, and vegetation, as well as bird habitat features, were considered in the design and operation criteria for the recharge basins as described in the following.

Design Criteria #1: Allow water to be maintained on site during recharge operations -- Recharge basins use man-made berms to maintain water on site. Several thousand acres of groundwater recharge basins have been constructed on the Kern River Fan over the past 30 years. Some are in the primary flood plain that was not previously developed, but most are on previously farmed and leveled properties. Typical construction matches the existing field boundaries as they neighbor existing agricultural production.

Slope and Berm Construction: The Project area has a predominate land slope of 2 feet per mile which will remain after recharge basin construction. Project recharge basin berms will be constructed with compacted earth from the project site at approximately two to six feet in height. Berms may also serve as roadways. Project recharge basin water depths will range from 0 up to 24 inches.

Ponding duration and timing: Project water will provide wetland habitat during the winter months of wet, above normal and normal water years when recharge activity occurs. Water is expected to be in the recharge basins for an average duration of 1.5 months during years in which active recharge of Article 21 water occurs in the winter months. Based on historical availability of other water supplies during normal and wet years, the benefits from the intermittent wetland habitat could be extended by upwards of 12 operating months.

Design Criteria #2: Develop hydric soils during recharge operations -- The United States Department of Agriculture defines hydric soil as a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part[2]. Soils that are sufficiently wet because of artificial measures, such as operations of recharge basins, are included in the concept of hydric soils.

Presence of Hydric Soils: Project recharge basins will typically hold water from 1 month to upwards of 12 months which allow for the development of hydric soils during the growing season. RRBWSD finds that hydric soils typically form within existing recharge basins by the third or fourth week of flooding due to gradual saturation of the soils. This is expected to occur at the Project recharge basins. During this period, typical recharge rates within the basins are expected to slow from an initial infiltration rate of up to 1 acre-foot per day to a maintenance rate of about 0.4 acre-feet per day.

Design Criteria #3: Establish hydrophytic vegetation during recharge operations -- Hydric soils result in sufficiently wet conditions to support the natural growth and regeneration of hydrophytic vegetation. Recharge basin design, operation, and maintenance also allow for the planting and establishment of hydrophytic vegetation.

Project Berms and Islands: Project berm and island banks will be built at a 4:1 slope with a minimum 1.5' freeboard which will result in at least a 6 to 10 foot wide vegetative strip above the water line with vegetation extending into shallow water areas. Each basin would include 1-2 islands with similar gradual sloped banks and freeboard requirements. During recharge periods mowing of the berms and islands is limited to support growth of significant vegetation ranging from 6 to 36 inches tall. Shallow water areas would also experience vegetation growth of variable height. Established hydrophytic vegetation is expected to include common spikerush (*Eleocharis macrostachya*), Baltic rush (*Juncus balticus*), common knotweed (*Polygonum lapathifolium*), annual beard grass (*Polypogon monspeliensis*), broadleaf cattail (*Typha latifolia*) Fremont cottonwood (*Populus fremontii*), and Goodding's black willow (*Salix gooddingii*).

Design Criteria #4: Establish habitat for birds during recharge operations – RRBWSD has been working with the Environmental Defense Fund (EDF) in an effort to construct and operate recharge facilities that have multi-benefits, including intermittent wetlands and bird habitat. EDF partnered with Point Blue Conservation Science, Audubon California and Sustainable Conservation to develop a guide on how to build this kind of preferred recharge basin that provides operational benefits to basin management while also creating valuable water bird habitat. Figure 9, included at the end of this addendum, is the guide prepared by EDF. This guide describes the wildlife benefits associated with the multi-uses of recharge basins as intermittent wetlands.

Basin Design: The Project basins are designed to improve recharge and are less likely to plug with fine sediments while also incidentally creating habitat through the formation of hydric soils. Additional recharge basin design considerations are included to provide bird habitat in the intermittent wetlands created in the Project recharge ponds. Per EDF's recommendation, recharge basins will be constructed at multiple water depths to benefit both shorebirds and waterfowl. Shorebirds prefer mudflats to a depth of up to 6" with sparse vegetation (<40%) while waterfowl prefer depths of 6" to above 18" with a combination of open water

[2] US Department Agriculture, Natural Resources Conservation Service: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/?cid=nrcs142p2_053961

and wetland cover (see Figures 1, 2 and 3). Dry land (berms or islands) are important for resting areas with dense vegetation (see Figures 4, 5 and 6).

Basin Depths: Each typical basin would yield 1/3 of the depths suitable for shorebird mudflats and 2/3 suitable for waterfowl preferred depths (see Figures 2, 3 and 7).

Ponding Duration: The project is expected to provide wetland habitat to migratory birds whenever recharge activity occurs on the project sites. Based on historical availability of all water supplies, the duration of incidental wetland habitat from water ponding could range from 1.5 months to upwards of 12 operating months, which allows for the development of hydric soils during the growing season (see Figure 1).

Berms and Islands: Earthen berms and islands will also provide necessary resting areas on the banks. During recharge periods, mowing is limited on the berms and islands to support vegetation growth from 6 to 36 inches tall (see Figures 4, 5 and 6). The costs for dry land berms and islands are included in the Project cost line item for levee embankment fill. These costs are included in the earthwork quantities in the recharge basin construction costs. The cost of maintaining the berms and islands, including occasionally mowing, are included in the Project's operations and maintenance (O&M) costs.

Raptor Boxes: Burrowing rodents can cause structural damage to earthen berms. To offset harmful effects of rodenticides on wildlife --- owl and hawk boxes and perching structures will be installed every 0.25 mile of berm. The Project will rely on raptor boxes and perches and use of rodenticides only as necessary to protect berm stability and to thus protect the intermittent wetlands created by the operation of the Project recharge basins. The costs for installing raptor boxes are included in the interbasin structure line item for miscellaneous steel and weir boards. The estimated cost of occasionally maintenance or repair of raptor boxes is included in the Project's O&M costs.

Managing Basins During Non-Recharge

The Project recharge basins will allow native vegetation (non-noxious weeds) and seeded forage crops to provide dry cover crop and wildlife cover and forage during non-recharge periods (see photos in Figure 8). In order to promote future cover crops or natural vegetation growth each year, basins would be grazed by sheep or cattle or mowed as necessary. No-till planting methods, rather than disking, would be used to seed forage crops. Disking operations promotes noxious weed growth and would be avoided. The cost of the seeding and mowing activities is included in the Project's O&M costs.

Managing sediments: RRBWSD's managed recharge basins have not experienced recharge impacts from settlement of fine sediments or bacterial fowling. Sediment is typically settled prior to reaching this portion of the service area. To the extent that this does occur, these materials would be scraped and placed on islands. The estimated cost of occasional scraping of the basins is included in the Project's O&M costs.

Adaptive Management of Intermittent Wetlands

Land and wildlife management is dynamic. As weather and climatic patterns change -- landscapes, including intermittent wetlands, will react. Plants and wildlife will adapt to these changes on a variable basis, so it is recognized that recharge basin management will need to adapt as well to optimize wetland benefits. To meet the demands of the environment and Project an adaptive management plan will be developed and

implemented for the management of the Project recharge basins as well as the management of the intermittent wetlands created during the operation of the basins. This plan will include annual biota reports including adaptive management recommendations to be considered and implemented, as appropriate to optimize project water management and wildlife goals.

Figure 1. Example of a RRBWSD recharge basin with ponded water during the growing season that allows for the establishment of hydric soils and vegetation.

Figure 2. Typical RRBWSD Recharge Basin with mix of mudflats and open water

Figure 3. Mudflats with shorebirds on Strand Recharge Basins

Figure 4. Upland vegetation on recharge basin berm provides habitat for birds.

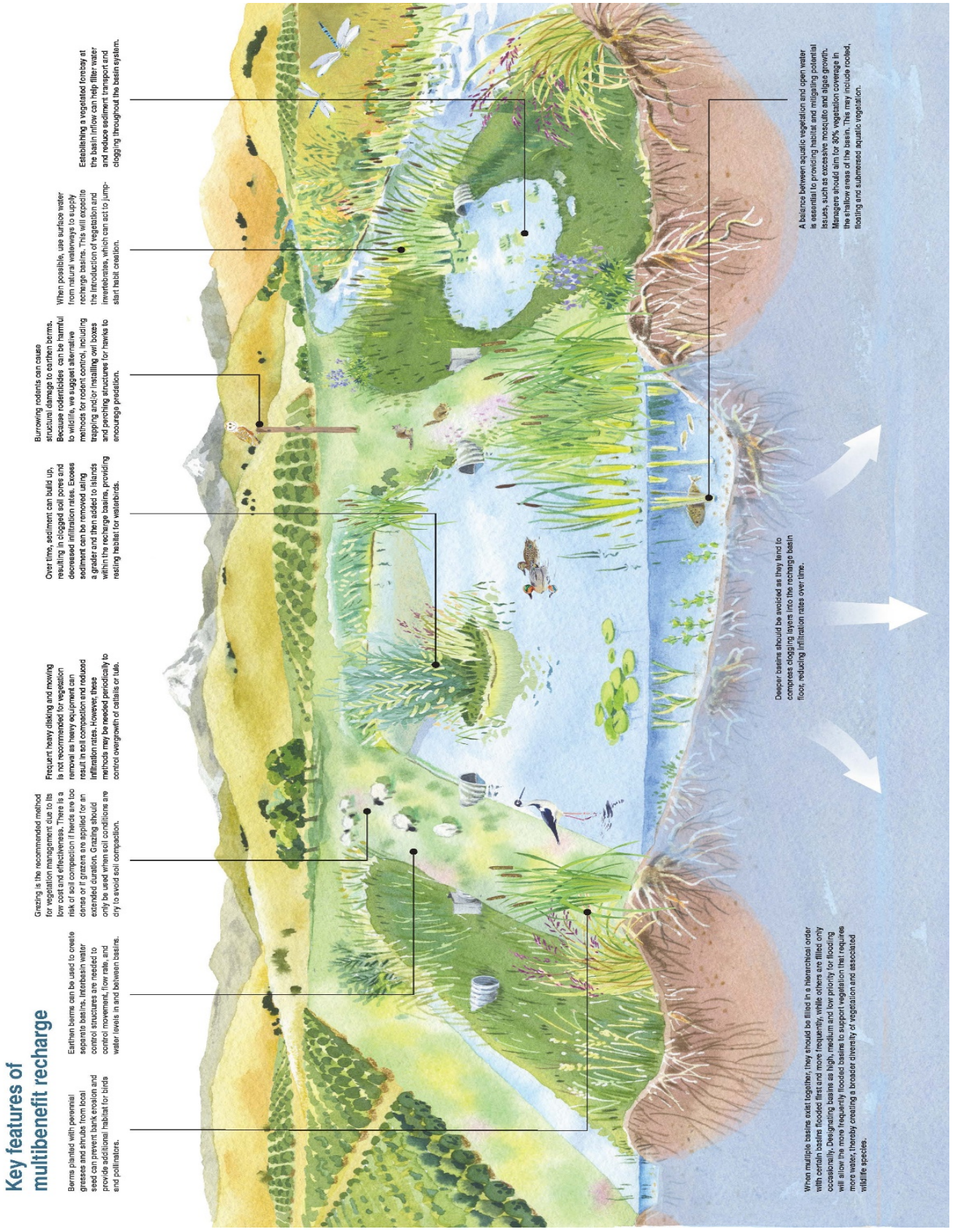
Figure 5. Typical RRBWSD Recharge Basin Berm Water Line Habitat

Figure 6. Typical RRBWSD Recharge Basin Island

Figure 7. Three Photos of typical waterfowl in Strand Recharge Basins during Recharge Periods

Figure 8. Three Photos of typical RRBWSD Recharge Basins During Non-Recharge Periods

Figure 9. Environmental Defense Fund Guide on Building Multi-Benefit Basins



	Shorebirds	Waterfowl	Pollinators
WILDLIFE TARGET	 • Legs are often long and thin. • Bills thin. If long, then used to probe in the soil. If short, then used to peck food off the surface of the ground. • Eat various bugs, worms and other invertebrates. • 13 species use the Central Valley regularly. • Some populations are declining; others are stable.	 • Ducks, geese and swans • Most have flat bills that filter plants, seeds and invertebrates from the water and mud for food. • Webbed feet make them strong swimmers. • Some populations are declining; others are stable.	 • More than 1,000 species of honey bees, native bees, butterflies and beetles. • Wide range of sizes and colors, from tiny sweat bees less than ¼" long to monarch butterflies larger than 3". • Nearly all populations are declining.
HABITAT CHARACTERISTICS	• Open mudflats or shallowly flooded environments. • Some short, sparse vegetation is OK. • Less than 40% vegetation cover is recommended. • Remaining vegetation should be smashed or incorporated.	• Open water is generally preferred for feeding. • Some species like vegetation (cattails/tules) to hide in. • Some dry land (berms or islands) is important for resting areas. • Vegetation on resting areas should not be very dense. However, some species that breed in Central Valley would use denser vegetation for nesting. • Forage plants for waterfowl (watergrass, smartweed and swamp timothy) will provide food during winter.	• Prefer a diversity of native vegetation that flowers (providing food and cover) throughout the year. • Plant vegetation along the sides and throughout the basin bottom. • Drier areas should remain undisturbed (no disking) to provide nesting habitat in soil.
WATER MANAGEMENT	**Timing** • Shorebirds are present in the Central Valley year-round. • Migration is a critical period when habitat is needed: spring (March to May) and fall (July to September). **Depth** • Saturated mudflat to 6 inches deep. • Variable water depth is ideal and will benefit a wider diversity of shorebirds and other waterbirds.	**Timing** • Winter (October to March) is the most important time to provide habitat for waterfowl in the Central Valley. • Some species breed in the Central Valley from March to mid-July. **Depth** • Water depths from 6 inches to 18 inches are recommended. • Some species will use depths greater than 18 inches. • Forage plants may require additional irrigation in dry periods.	**Timing** • Water should not inundate vegetation for long periods in areas designated as a dry zone because it can kill the plants and drowns the burrowing insects. **Depth** • Plant in zones related to how much water each will likely receive. Some will only get winter rain, some flooded only occasionally, others flooded regularly.

This document highlights best practices as understood by wildlife experts and practitioners as of February 2020.
If you are interested in participating in a pilot project or providing feedback, please contact **recharge@pointblue.org**

Audubon CALIFORNIA

EDF ENVIRONMENTAL DEFENSE FUND — Finding the ways that work

Point Blue Conservation Science

Sustainable Conservation

Building multibenefit recharge basins

As California faces an unpredictable water future, policy makers and water managers across the state are seeking solutions to build resilience into our water supply system. Groundwater recharge is an excellent tool to replenish depleted aquifers and bank water for future use. In addition to helping water managers balance their water budget, groundwater recharge also provides an opportunity to create habitat for wildlife. This guide highlights recharge basin management strategies that create wildlife habitat and provide operational benefits to basin managers.

Operational Benefits

Reduce sediment and clogging

Sediment buildup and pore clogging can greatly diminish the efficiency of basin recharge. Creating multiple subbasins within a series can allow for the first receiving basin to act as a settling area, enabling the successive basins to recharge more efficiently over time. Settling basins filter fine sediment in the water and minimize clogging of successive recharge ponds. Creating basins with a sloped floor will result in sediment accumulation in a smaller area, reducing the operational cost of removing sediment buildup.

Planting vegetation on basin bottoms during dry spells can also help maintain recharge rates over time as roots create channels for water to infiltrate the soil.

Stabilize basins

Planting vegetation along the sides of basins will help prevent erosion and stabilize berms. These plantings can also inhibit the establishment of nuisance weeds such as Russian thistle. Installing perching structures for hawks can help control burrowing rodents that can compromise berms.

Funding Sources

Potential federal, state and local funding sources for multibenefit recharge projects that create waterbird habitat include:

- Wildlife Conservation Board Pacific Flyway Program
- U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program
- Natural Resources Conservation Service Environmental Quality Incentives Program
- California Department of Fish and Wildlife California Waterfowl Habitat Program

Appendix E
Energy Calculations

ESA

Summary of Energy Use During Project Construction

Energy Type	Annual Average Quantity During Construction [b]	
Gasoline		
On-Road Construction Equipment	9,423	gallons
Off-Road Construction Equipment	0	gallons
Total Gasoline	**9,423**	gallons
Diesel		
On-Road Construction Equipment	41,265	gallons
Off-Road Construction Equipment	141,519	gallons
Total Diesel	**182,784**	gallons

Kern Fan Groundwater

Total On-Road Fuel Consumption

		gal/mile	gal/min
2021Hauling	Hauling	0.15067657	3.86551E-05
2021Vendor	Vendor	0.13112558	6.0643E-05
2021Worker	Worker	0.03788532	7.74256E-07
2022Hauling	Hauling	0.1469647	3.80972E-05
2022Vendor	Vendor	0.12767732	6.03275E-05
2022Worker	Worker	0.0368183	7.52449E-07
2023Hauling	Hauling	0.14080239	3.68642E-05
2023Vendor	Vendor	0.1225625	5.92463E-05
2023Worker	Worker	0.03575646	7.30749E-07
2024Hauling	Hauling	0.13842029	3.65691E-05
2024Vendor	Vendor	0.12081632	5.96695E-05
2024Worker	Worker	0.03471743	9.2758E-07

Trip Type	Fuel Use (gal)	Fuel Type
Hauling	43,849	Diesel
Vendor	34,214	Diesel
Worker	18,545	Gasoline
Annual Average Fuel Consumption		
Hauling	12,573	Diesel
Vendor	9,810	Diesel
Worker	5,317	Gasoline

3.5	years

Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (gallons) gal/mile	gal/min	gal/year
Demolition/Site Clearing	2021							
Total Haul Trips	0							
Hauling	642	65	10	20	15	0.15	3.87E-05	1,935
Vendor	260	65	10	25	15	0.13	6.06E-05	852
Worker	650	65	10	16.8	0	0.04	7.74E-07	414
Pipelines	2021							
Total Haul Trips	0							
Hauling	30	65	10	4	15	0.15	3.87E-05	18
Vendor	130	65	10	25	15	0.13	6.06E-05	426
Worker	650	65	10	16.8	0	0.04	7.74E-07	414
Basins-2021	2021							
Total Haul Trips	0							
Hauling	22743	131	10	4	15	0.15	3.87E-05	13,714
Vendor	524	131	10	25	15	0.13	6.06E-05	1,718
Worker	2620	131	10	16.8	0	0.04	7.74E-07	1,668
Basins-2022	2022							
Total Haul Trips	0							
Hauling	8950	85	10	4	15	0.15	3.81E-05	5,264
Vendor	340	85	10	25	15	0.13	6.03E-05	1,085
Worker	1700	85	10	16.8	0	0.04	7.52E-07	1,052
Restoration	2022							
Total Haul Trips	0							
Hauling	0	21	10	4	15	0.15	3.81E-05	0
Vendor	84	21	10	25	15	0.13	6.03E-05	268
Worker	126	21	10	16.8	0	0.04	7.52E-07	78
Well Drilling	2022							
Total Haul Trips	0							
Hauling	8	44	10	4	15	0.15	3.81E-05	28
Vendor	176	44	10	25	15	0.13	6.03E-05	3,371
Worker	440	44	10	16.8	0	0.04	7.52E-07	1,633

Kern Fan Groundwater

Total On-Road Fuel Consumption

		gal/mile	gal/min
2021Hauling	Hauling	0.15067657	3.86551E-05
2021Vendor	Vendor	0.13112558	6.0643E-05
2021Worker	Worker	0.03788532	7.74256E-07
2022Hauling	Hauling	0.1469647	3.80972E-05
2022Vendor	Vendor	0.12767732	6.03275E-05
2022Worker	Worker	0.0368183	7.52449E-07
2023Hauling	Hauling	0.14080239	3.68642E-05
2023Vendor	Vendor	0.1225625	5.92463E-05
2023Worker	Worker	0.03575646	7.30749E-07
2024Hauling	Hauling	0.13842029	3.65691E-05
2024Vendor	Vendor	0.12081632	5.96695E-05
2024Worker	Worker	0.03471743	9.2758E-07

Trip Type	Fuel Use (gal)	Fuel Type
Hauling	43,849	Diesel
Vendor	34,214	Diesel
Worker	18,545	Gasoline
Annual Average Fuel Consumption		
Hauling	12,573	Diesel
Vendor	9,810	Diesel
Worker	5,317	Gasoline

3.5	years

Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (gallons) gal/mile	gal/min	gal/year
Well Construction	2023							
Total Haul Trips	0							
Hauling	0	50	10	4	15	0.14	3.69E-05	0
Vendor	202	50	10	25	15	0.12	5.92E-05	3,714
Worker	500	50	10	16.8	0	0.04	7.31E-07	1,802
Pipelines	2023							
Total Haul Trips	0							
Hauling	122	65	10	4	15	0.14	3.69E-05	412
Vendor	260	65	10	25	15	0.12	5.92E-05	4,780
Worker	650	65	10	16.8	0	0.04	7.31E-07	2,343
Demolition/Site Clearing	2022							
Total Haul Trips	0							
Hauling	642	67	10	4	15	0.15	3.81E-05	378
Vendor	368	67	10	25	15	0.13	6.03E-05	1,175
Worker	670	67	10	16.8	0	0.04	7.52E-07	414
Pipelines	2022							
Total Haul Trips	0							
Hauling	30	67	10	4	15	0.15	3.81E-05	18
Vendor	368	67	10	25	15	0.13	6.03E-05	1,175
Worker	670	67	10	16.8	0	0.04	7.52E-07	414
Basins	2022							
Total Haul Trips	0							
Hauling	37500	220	10	4	15	0.15	3.81E-05	22,055
Vendor	1224	220	10	25	15	0.13	6.03E-05	3,907
Worker	4400	220	10	16.8	0	0.04	7.52E-07	2,722
Restoration	2022							
Total Haul Trips	0							
Hauling	0	22	10	4	15	0.15	3.81E-05	0
Vendor	120	22	10	25	15	0.13	6.03E-05	383
Worker	132	22	10	16.8	0	0.04	7.52E-07	82

Kern Fan Groundwater

Total On-Road Fuel Consumption

		gal/mile	gal/min
2021Hauling	Hauling	0.15067657	3.86551E-05
2021Vendor	Vendor	0.13112558	6.0643E-05
2021Worker	Worker	0.03788532	7.74256E-07
2022Hauling	Hauling	0.1469647	3.80972E-05
2022Vendor	Vendor	0.12767732	6.03275E-05
2022Worker	Worker	0.0368183	7.52449E-07
2023Hauling	Hauling	0.14080239	3.68642E-05
2023Vendor	Vendor	0.1225625	5.92463E-05
2023Worker	Worker	0.03575646	7.30749E-07
2024Hauling	Hauling	0.13842029	3.65691E-05
2024Vendor	Vendor	0.12081632	5.96695E-05
2024Worker	Worker	0.03471743	9.2758E-07

Trip Type	Fuel Use (gal)	Fuel Type
Hauling	43,849	Diesel
Vendor	34,214	Diesel
Worker	18,545	Gasoline
Annual Average Fuel Consumption		
Hauling	12,573	Diesel
Vendor	9,810	Diesel
Worker	5,317	Gasoline

3.5	years

Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (gallons) gal/mile	gal/min	gal/year
Well Drilling	2023							
Total Haul Trips	0							
Hauling	8	42	10	4	15	0.14	3.69E-05	27
Vendor	168	42	10	25	15	0.12	5.92E-05	3,089
Worker	420	42	10	16.8	0	0.04	7.31E-07	1,514
Well Construction-2023	2023							
Total Haul Trips	0							
Hauling	0	20	10	4	15	0.14	3.69E-05	0
Vendor	82	20	10	25	15	0.12	5.92E-05	1,508
Worker	200	20	10	16.8	0	0.04	7.31E-07	721
Well Construction-2024	2024							
Total Haul Trips	0							
Hauling	0	30	10	4	15	0.14	3.66E-05	0
Vendor	120	30	10	25	15	0.12	5.97E-05	2,175
Worker	300	30	10	16.8	0	0.03	9.28E-07	1,050
Pipelines-2023	2023							
Total Haul Trips	0							
Hauling	0	20	10	4	15	0.14	3.69E-05	0
Vendor	80	20	10	25	15	0.12	5.92E-05	1,471
Worker	200	20	10	16.8	0	0.04	7.31E-07	721
Pipelines-2024	2024							
Total Haul Trips	0							
Hauling	0	43	10	4	15	0.14	3.66E-05	0
Vendor	172	43	10	25	15	0.12	5.97E-05	3,117
Worker	430	43	10	16.8	0	0.03	9.28E-07	1,505

Kern Fan Groundwater Project

Total On-Road Fuel Consumption

		gal/mile	gal/min
2023Hauling	Hauling	0.14080239	3.68642E-05
2023Vendor	Vendor	0.1225625	5.92463E-05
2023Worker	Worker	0.03575646	7.30749E-07
2024Hauling	Hauling	0.13842029	3.65691E-05
2024Vendor	Vendor	0.12081632	5.96695E-05
2024Worker	Worker	0.03471743	9.2758E-07
2025Hauling	Hauling	0.13560219	3.58876E-05
2025Vendor	Vendor	0.11876987	5.94547E-05
2025Worker	Worker	0.03367746	8.99794E-07
2026Hauling	Hauling	0.13265382	3.5116E-05
2026Vendor	Vendor	0.11664401	5.90612E-05
2026Worker	Worker	0.0326492	4.20695E-07

Trip Type	Fuel Use (gal)	Fuel Type
Hauling	34,789	Diesel
Vendor	31,065	Diesel
Worker	14,321	Gasoline
Annual Average Fuel Consumption		
Hauling	9,975	Diesel
Vendor	8,907	Diesel
Worker	4,106	Gasoline

3.5	years

Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (gallons) gal/mile	gal/min	gal/year
Turnout, Pipelines, Canal-2023	2023							
Total Haul Trips	0							
Hauling	16967	178	10	3.3	15	0.14	3.69E-05	7,888
Vendor	1717	178	10	25	15	0.12	5.92E-05	5,262
Worker	3560	178	10	16.8	0	0.04	7.31E-07	2,139
Turnout, Pipelines, Canal-2024	2024							
Total Haul Trips	0							
Hauling	24973	262	10	3.3	15	0.14	3.66E-05	11,414
Vendor	2484	262	10	25	15	0.12	5.97E-05	7,504
Worker	5240	262	10	16.8	0	0.03	9.28E-07	3,056
Turnout, Pipelines, Canal-2025	2025							
Total Haul Trips	0							
Hauling	24877	261	10	3.3	15	0.14	3.59E-05	11,139
Vendor	2474	261	10	25	15	0.12	5.95E-05	7,347
Worker	5220	261	10	16.8	0	0.03	9.00E-07	2,953
Turnout, Pipelines, Canal-2026	2026							
Total Haul Trips	0							
Hauling	9436	99	10	3.3	15	0.13	3.51E-05	4,133
Vendor	939	99	10	25	15	0.12	5.91E-05	2,739
Worker	1980	99	10	16.8	0	0.03	4.21E-07	1,086
Pumpstations-2023	2023							
Total Haul Trips	0							
Hauling	154	178	10	3.3	15	0.14	3.69E-05	215
Vendor	724	178	10	25	15	0.12	5.92E-05	6,655
Worker	2136	178	10	16.8	0	0.04	7.31E-07	3,849
Pumpstations-2024	2024							
Total Haul Trips	23							
Hauling	0	43	10	3.3	15	0.14	3.66E-05	0
Vendor	172	43	10	25	15	0.12	5.97E-05	1,559
Worker	516	43	10	16.8	0	0.03	9.28E-07	903
Construction Phase	2026							
Total Haul Trips	0							
Hauling	0	61	10	3.3	15	0.13	3.51E-05	0
Vendor	0	61	10	25	15	0.12	5.91E-05	0
Worker	610	61	10	16.8	0	0.03	4.21E-07	335

Construction Energy Analysis
Off-Road Equipment - Diesel

Equipment ≤ 100 hp

esel fuel/hp-hr (lb/hp-hr):[1]	0.408	lb/hp-hr
diesel density (lb/gal):[1]	7.11	lb/gal
diesel gallons/hp-hr:	0.0574	gal/hp-hr
ss than or equal to 100 HP:	1,094,417	hp-hr
Total diesel gallons:	62,812	gal

Equipment > 100 hp

esel fuel/hp-hr (lb/hp-hr):[1]	0.367	lb/hp-hr
diesel density (lb/gal):[1]	7.11	lb/gal
diesel gallons/hp-hr:	0.0516	gal/hp-hr
Greater than 100 HP:	8,343,975	hp-hr
Total diesel gallons:	430,761	gal

lons (off-road equipment):	493,573	gal
	3.5	years
	141,519	**average annual gallons**

Phase	Phase Name	Equipment	Number	Hours/Day	Number of Phases	HP	Load	Days	Total hp-hr
Conveyance	Canal,Turnout,Pipelines	Cement and Mortar Mixers	1	8	1	9	0.56	800	32,256
Conveyance	Canal,Turnout,Pipelines	Cranes	1	8	1	231	0.29	800	428,736
Conveyance	Canal,Turnout,Pipelines	Excavators	2	8	1	158	0.38	800	768,512
Conveyance	Canal,Turnout,Pipelines	Graders	1	8	1	187	0.41	800	490,688
Conveyance	Canal,Turnout,Pipelines	Rubber Tired Loaders	1	8	1	203	0.36	800	467,712
Conveyance	Canal,Turnout,Pipelines	Tractors/Loaders/Backhoes	1	8	1	97	0.37	800	229,696
Pump Stations	Building Construction	Cement and Mortar Mixers	1	8	3	9	0.56	221	26,732
Pump Stations	Building Construction	Cranes	1	8	3	231	0.29	221	355,315
Pump Stations	Building Construction	Excavators	1	8	3	158	0.38	221	318,452
Pump Stations	Building Construction	Rubber Tired Loaders	1	8	3	203	0.36	221	387,616
Pump Stations	Building Construction	Tractors/Loaders/Backhoes	1	8	3	97	0.37	221	190,361
Recharge - Phase 1	Demolition	Excavators	2	8	1	158	0.38	65	62,442
Recharge - Phase 1	Demolition	Graders	1	8	1	187	0.41	65	39,868
Recharge - Phase 1	Demolition	Rubber Tired Loaders	1	8	1	203	0.36	65	38,002
Recharge - Phase 1	Pipelines	Cranes	1	8	1	231	0.29	65	34,835
Recharge - Phase 1	Pipelines	Excavators	1	8	1	158	0.38	65	31,221
Recharge - Phase 1	Pipelines	Graders	1	8	1	187	0.41	65	39,868
Recharge - Phase 1	Pipelines	Rubber Tired Loaders	1	8	1	203	0.36	65	38,002
Recharge - Phase 1	Pipelines	Tractors/Loaders/Backhoes	1	8	1	97	0.37	65	18,663
Recharge - Phase 1	Basins	Excavators	2	8	1	158	0.38	216	207,498
Recharge - Phase 1	Basins	Graders	4	8	1	187	0.41	216	529,943
Recharge - Phase 1	Basins	Rubber Tired Loaders	1	8	1	203	0.36	216	126,282
Recharge - Phase 1	Restoration	Graders	1	8	1	187	0.41	21	12,881
Recharge - Phase 1	Restoration	Tractors/Loaders/Backhoes	1	8	1	97	0.37	21	6,030
Recharge - Phase 2	Demolition	Excavators	2	8	1	158	0.38	67	64,363
Recharge - Phase 2	Demolition	Graders	1	8	1	187	0.41	67	41,095
Recharge - Phase 2	Demolition	Rubber Tired Loaders	1	8	1	203	0.36	67	39,171
Recharge - Phase 2	Pipelines	Cranes	1	8	1	231	0.29	67	35,907
Recharge - Phase 2	Pipelines	Excavators	1	8	1	158	0	67	32,181
Recharge - Phase 2	Pipelines	Graders	1	8	1	187	0	67	41,095
Recharge - Phase 2	Pipelines	Rubber Tired Loaders	1	8	1	203	0	67	39,171
Recharge - Phase 2	Pipelines	Tractors/Loaders/Backhoes	1	8	1	97	0	67	19,237
Recharge - Phase 2	Basins	Excavators	2	8	1	158	0	220	211,341
Recharge - Phase 2	Basins	Graders	4	8	1	187	0	220	539,757
Recharge - Phase 2	Basins	Rubber Tired Loaders	1	8	1	203	0	220	128,621
Recharge - Phase 2	Restoration	Graders	1	8	1	187	0	22	13,494
Recharge - Phase 2	Restoration	Tractors/Loaders/Backhoes	1	8	1	97	0	22	6,317
Recovery Well - Phase 1	Drilling	Bore/Drill Rigs	1	8	6	221	1	44	233,376
Recovery Well - Phase 1	Drilling	Rubber Tired Loaders	1	8	6	203	0	44	154,345
Recovery Well - Phase 1	Drilling	Tractors/Loaders/Backhoes	1	8	6	97	0	44	75,800
Recovery Well - Phase 1	Construction	Cement and Mortar Mixers	1	8	6	9	1	50	12,096
Recovery Well - Phase 1	Construction	Cranes	1	8	6	231	0	50	160,776
Recovery Well - Phase 1	Construction	Tractors/Loaders/Backhoes	1	8	6	97	0	50	86,136
Recovery Well - Phase 1	Pipelines	Cranes	1	8	6	231	0	65	209,009
Recovery Well - Phase 1	Pipelines	Excavators	1	8	6	158	0.38	65	187,325
Recovery Well - Phase 1	Pipelines	Graders	1	8	6	187	0	65	239,210
Recovery Well - Phase 1	Pipelines	Rubber Tired Loaders	1	8	6	203	0	65	228,010
Recovery Well - Phase 1	Pipelines	Tractors/Loaders/Backhoes	1	8	6	97	0	65	111,977
Recovery Well - Phase 2	Drilling	Bore/Drill Rigs	1	8	6	221	1	42	222,768
Recovery Well - Phase 2	Drilling	Rubber Tired Loaders	1	8	6	203	0	42	147,329
Recovery Well - Phase 2	Drilling	Tractors/Loaders/Backhoes	1	8	6	97	0	42	72,354
Recovery Well - Phase 2	Construction	Cement and Mortar Mixers	1	8	6	9	1	50	12,096
Recovery Well - Phase 2	Construction	Cranes	1	8	6	231	0	50	160,776
Recovery Well - Phase 2	Construction	Tractors/Loaders/Backhoes	1	8	6	97	0	50	86,136
Recovery Well - Phase 2	Pipelines	Cranes	1	8	6	231	0	63	202,578
Recovery Well - Phase 2	Pipelines	Excavators	1	8	6	158	0	63	181,561
Recovery Well - Phase 2	Pipelines	Graders	1	8	6	187	0	63	231,850
Recovery Well - Phase 2	Pipelines	Rubber Tired Loaders	1	8	6	203	0	63	220,994
Recovery Well - Phase 2	Pipelines	Tractors/Loaders/Backhoes	1	8	6	97	0	63	108,531
								Greater than 100 HP:	8,343,975
								Less than or equal to 100 HP:	1,094,417

Summary of Operational Energy Consumption

Electricity Use and Water Energy Intensity

Operational Activity	Number	Annual Water Throughput (AF/year)	Energy Intensity (kWh/AF)	Electricity Use(kWh/year)	Electricity Use(MWh/year)	State Electricity Use in 2018 (MWh)	% of State
Electricity							
Pump Stations	3	100,000	30	9,000,000	9,000		
Recovery Wells	12	4,167	600	30,000,000	30,000		
Total Electricity	**-**	**-**	**-**	**39,000,000**	**39,000**	**284,436,262**	**0.01%**

Operational Fuel Use

Operational Activity	Annual Fuel Use (gal/year)
Gasoline	
On-Road Vehicles	555
Diesel	
On-Road Vehicles	5,128
Off-Road Vehicles	24,626
Diesel Total	**29,754**

Kern Fan Groundwater Project

Total On-Road Fuel Consumption

		gal/mile	gal/min
2024Hauling	Hauling	0.13842029	3.65691E-05
2024Vendor	Vendor	0.12081632	5.96695E-05
2024Worker	Worker	0.03471743	9.2758E-07
2025Hauling	Hauling	0.13560219	3.58876E-05
2025Vendor	Vendor	0.11876987	5.94547E-05
2025Worker	Worker	0.03367746	8.99794E-07
2026Hauling	Hauling	0.13265382	3.5116E-05
2026Vendor	Vendor	0.11664401	5.90612E-05
2026Worker	Worker	0.0326492	4.20695E-07
2027Hauling	Hauling	0.12947848	3.42391E-05
2027Vendor	Vendor	0.11433083	5.84617E-05
2027Worker	Worker	0.03179334	4.09667E-07

Source	Fuel Use (gal)
Hauling	4,670
Vendor	457
Worker	555
Diesel Total	**5,128**
Gas Total	**555**

Construction Phase	Annual One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)	Regional Emissions (gallons) gal/mile	gal/min	gal/year
Weed+Pest	2026							
Total Haul Trips	0							
Hauling	0	20	10	3.3	15	0.13	3.51E-05	0
Vendor	40	20	10	25	15	0.12	5.91E-05	117
Worker	80	20	10	16.8	0	0.03	4.21E-07	44
Weed+Pest	2027							
Total Haul Trips	0							
Hauling	0	20	10	3.3	15	0.13	3.42E-05	0
Vendor	40	20	10	25	15	0.11	5.85E-05	457
Worker	80	20	10	16.8	0	0.03	4.10E-07	171
Earthwork	2026							
Total Haul Trips	0							
Hauling	10924	90	10	3.3	15	0.13	3.51E-05	4,785
Vendor	0	90	10	25	15	0.12	5.91E-05	0
Worker	720	90	10	16.8	0	0.03	4.21E-07	395
Earthwork	2027							
Total Haul Trips	0							
Hauling	10924	90	10	3.3	15	0.13	3.42E-05	4,670
Vendor	0	90	10	25	15	0.11	5.85E-05	0
Worker	720	90	10	16.8	0	0.03	4.10E-07	385
Pumpstations-2023	2026							
Total Haul Trips	0							
Hauling	154	178	10	3.3	15	0.13	3.51E-05	67
Vendor	724	178	10	25	15	0.12	5.91E-05	2,112
Worker	2136	178	10	16.8	0	0.03	4.21E-07	1,172
Pumpstations-2024	2024							
Total Haul Trips	23							
Hauling	0	43	10	3.3	15	0.14	3.66E-05	0
Vendor	172	43	10	25	15	0.12	5.97E-05	520
Worker	516	43	10	16.8	0	0.03	9.28E-07	301
Construction Phase	2026							
Total Haul Trips	0							
Hauling	0	61	10	3.3	15	0.13	3.51E-05	0
Vendor	0	61	10	25	15	0.12	5.91E-05	0
Worker	610	61	10	16.8	0	0.03	4.21E-07	335

Construction Energy Analysis
Off-Road Equipment - Diesel

Equipment ≤ 100 hp

iesel fuel/hp-hr (lb/hp-hr):[1]	0.408	lb/hp-hr
diesel density (lb/gal):[1]	7.11	lb/gal
diesel gallons/hp-hr:	0.0574	gal/hp-hr
ess than or equal to 100 HP:	22,970	hp-hr
Total diesel gallons:	1,318	gal

Equipment > 100 hp

iesel fuel/hp-hr (lb/hp-hr):[1]	0.367	lb/hp-hr
diesel density (lb/gal):[1]	7.11	lb/gal
diesel gallons/hp-hr:	0.0516	gal/hp-hr
Greater than 100 HP:	451,486	hp-hr
Total diesel gallons:	23,308	gal

llons (off-road equipment):	24,626	gal
	1.00	years
	24,626	**average annual gallons**

Phase	Phase Name	Equipment	Number	Hours/Day	HP	Load	Days	Total hp-hr
Earthwork	Grading	Crawler Tractors	2	8	212	0.43	90	131,270
Earthwork	Grading	Graders	2	8	187	0.41	90	110,405
Earthwork	Grading	Rubber Tired Loaders	2	8	203	0.36	90	105,235
Weed and Pest Control	Site Preparation	Crawler Tractors	1	8	212	0.43	20	58,342
Weed and Pest Control	Site Preparation	Other Construction Equipment	1	8	172	0.42	20	46,234
Weed and Pest Control	Site Preparation	Tractors/Loaders/Backhoes	1	8	97	0.37	20	22,970
							Greater than 100 HP:	451,486
							Less than or equal to 100 HP:	22,970

Appendix F
Noise Emissions Calculations

ESA

Project: IRWD Groundwater Storage

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	8	Daytime hours (7 am to 7 pm)
	0	Evening hours (7 pm to 10 pm)
	0	Nighttime hours (10 pm to 7 am)
Leq to L10 factor	3	

				R1				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Recharge Facilities						**90**		
Demolition/Site Clearing					**85**	***84***		
Excavator	2	81	40%	50	84	80	83	0
Graders	1	85	40%	50	85	81	84	0
Rubber Tired Loader	1	79	40%	150	69	65	68	0
Pipelines					**81**	***78***		
Tractor/Loader/Backhoe	1	80	25%	50	80	74	77	0
Cranes	1	81	16%	50	81	73	76	0
Excavator	1	81	40%	150	71	67	70	0
Graders	1	85	40%	150	75	71	74	0
Rubber Tired Loader	1	79	40%	150	69	65	68	0
Basins					**91**	***88***		
Excavator	2	81	40%	50	84	80	83	0
Graders	4	85	40%	50	91	87	90	0
Rubber Tired Loader	1	79	40%	150	69	65	68	0
Restoration					**85**	***82***		
Tractor/Loader/Backhoe	1	80	25%	50	80	74	77	0
Graders	1	85	40%	50	85	81	84	0
Recovery Wells						**87**		
Well Drilling					**86**	***85***		
Tractor/Loader/Backhoe	4	80	25%	50	86	80	83	0
Bore/Drill Rig Truck	4	79	20%	50	85	78	81	0
Rubber Tired Loader	4	79	40%	50	85	81	84	0
Well Construction					**87**	***83***		
Tractor/Loader/Backhoe	4	80	25%	50	86	80	83	0
Cranes	4	81	16%	50	87	79	82	0
Cement and Mortar Mixers	4	79	40%	150	75	71	74	0
Pipelines					**87**	***84***		
Tractor/Loader/Backhoe	4	80	25%	50	86	80	83	0
Cranes	4	81	16%	50	87	79	82	0
Excavator	4	81	40%	150	77	73	76	0
Graders	4	85	40%	150	81	77	80	0
Rubber Tired Loader	4	79	40%	150	75	71	74	0
Conveyance Facilities						**83**		
Turnout, Pipelines, Canal					**81**	***79***		
Tractor/Loader/Backhoe	1	80	25%	50	80	74	77	0
Cranes	1	81	16%	50	81	73	76	0
Excavator	2	81	40%	150	74	70	73	0
Graders	1	85	40%	150	75	71	74	0
Rubber Tired Loader	1	79	40%	150	69	65	68	0
Cement and Mortar Mixers	1	79	40%	150	69	65	68	0
Pumpstation - Grading					**81**	***78***		
Tractor/Loader/Backhoe	1	80	25%	50	80	74	77	0
Cranes	1	81	16%	50	81	73	76	0
Excavator	1	81	40%	150	71	67	70	0
Rubber Tired Loader	1	79	40%	150	69	65	68	0
Cement and Mortar Mixers	1	79	40%	150	69	65	68	0
Pumpstation - Construction					**81**	***78***		
Tractor/Loader/Backhoe	1	80	25%	50	80	74	77	0
Cranes	1	81	16%	50	81	73	76	0
Excavator	1	81	40%	150	71	67	70	0
Rubber Tired Loader	1	79	40%	150	69	65	68	0
Cement and Mortar Mixers	1	79	40%	150	69	65	68	0
Maximum Noise Level (Overlapping Phases)								
Recharge Facilities, Conveyance Facilities, and 4 Recovery Wells						***92***		

Source for Ref. Noise Levels: LA CEQA Guides, 2006 & FHWA RCNM, 2005

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Kern Fan Groundwater Storage
Analysis Scenario: Construction
Source of Traffic Volumes: Construction Assumptions

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Construction Traffic	Hard	50	35	35	35	20	2	13	57.9	58.2

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

IRWD Kern Fan Groundwater Storage Project

Vibration Level Calculations

Based on Federal Transit Administration, Office of Planning and Environment

N =	1.5

Construction Equipment	Project Equipment	Equipment Peak Particle Velocity @ 25 Feet* (inches/second)	Distance to Receptor for < 0.5 PPV (Feet)	Estimated Velocity Decibels @ Distance** (VdB)	Estimated Peak Particle Velocity @ Distance*** (inches/second)
Unmitigated Vibration Levels					
R1					
Large Bulldozer or Bore/Drill Rig	Yes	0.089	50	77.9	0.031
Loaded Trucks	Yes	0.076	50	76.5	0.027
Jackhammer	Yes	0.035	50	69.8	0.012
Small Bulldozer	Yes	0.003	50	48.5	0.001

Source:

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* 2018.

Notes:

* Values taken from Table 7-4.

** Based on the formula VdB = 20 x LOG10 (v/v_{ref}), where v_{ref} is equal to 1×10^{-6} in/sec (see page 111).

The approximate rms vibration velocity level (v) is calculated from PPV using a crest factor of 4 (see page 184).

*** Based on the formula $PPV(D) = PPV(25\text{ ft}) \times (25/D)^N$, where D is equal to the distance (see page 185).

N = soil type classification factor (typically ranges from 1 to 1.5)

Appendix G
Tribal Correspondence

ESA

626 Wilshire Boulevard
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Los Angeles, CA 90017
213.599.4300 phone
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esassoc.com

July 23, 2020

Delia Dominguez, Chairperson
Kitanemuk & Yowlumne Tejon Indians
115 Radio Street
Bakersfield, CA 93305

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Dominguez:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

A search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was conducted on May 6, 2020. The results were negative, indicating that the NAHC does not have any sacred sites or Native American cultural resources on file within the proposed project areas (Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area).

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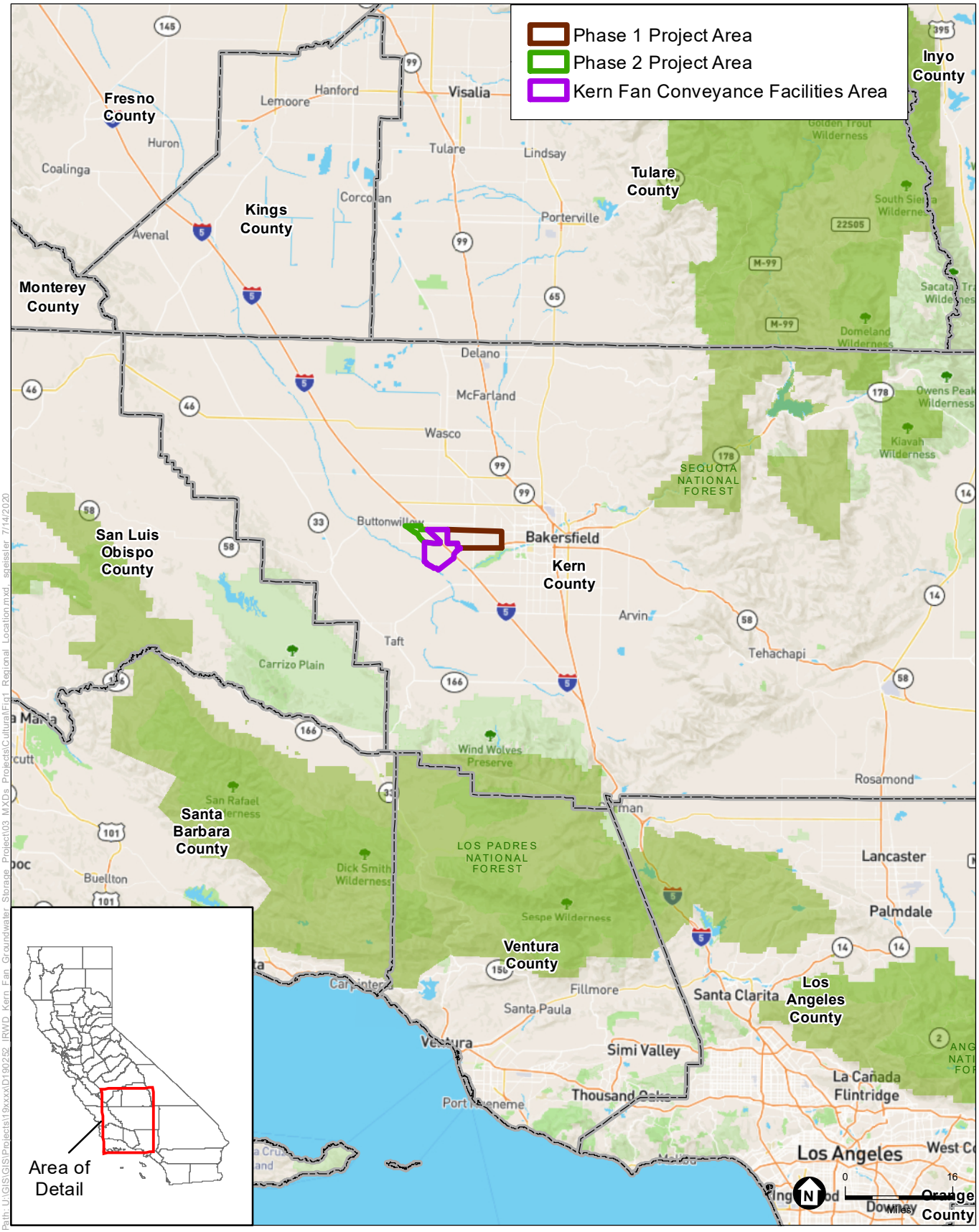
If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

Enclosures: Figure 1 – Regional Location
Figure 2 – Project Location
Figure 3 – Project Detail

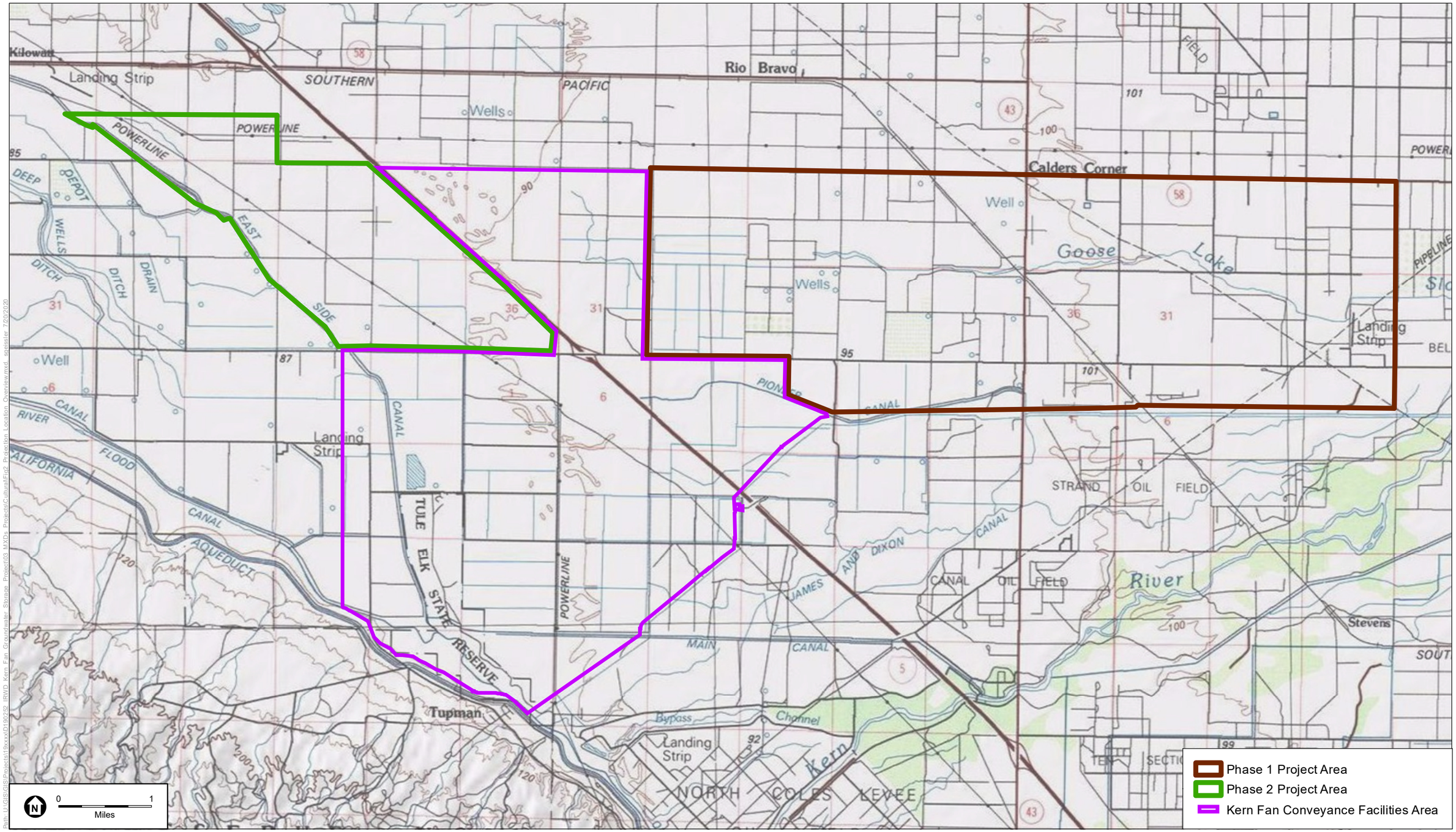


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



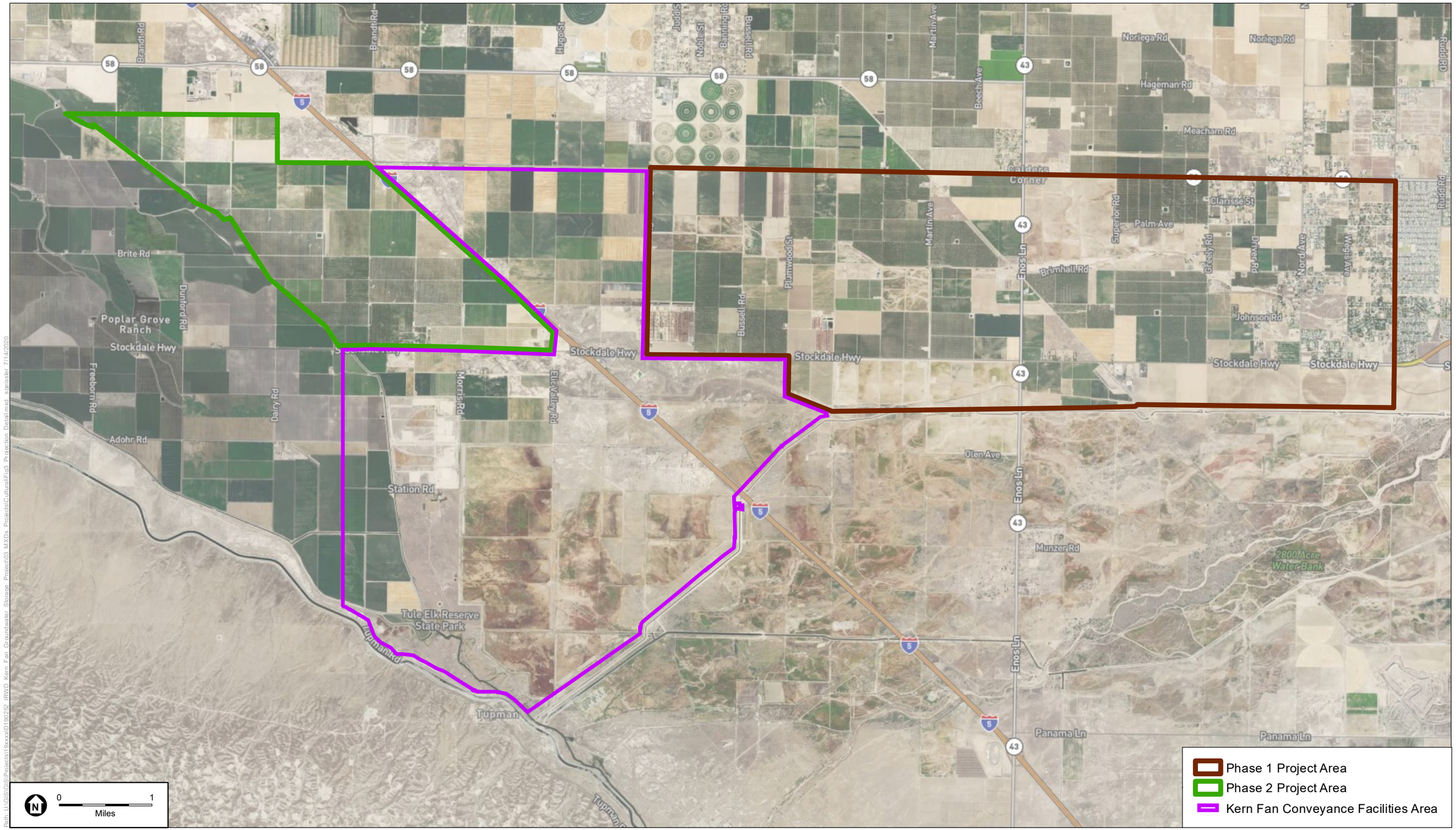
Path: U:\GIS\GIS\Projects\19xxxx\D190252 IRWD Kern Fan Groundwater Storage Project\03 MXDs Projects\Cultural\Fig2 Projection Location Overview.mxd, saeissler 7/20/2020

SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Octavio Escobedo III, Chairpeson
Tejon Indian Tribe
P.O. Box 640
Arvin, CA 93203

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Escobedo:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

A search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was conducted on May 6, 2020. The results were negative, indicating that the NAHC does not have any sacred sites or Native American cultural resources on file within the proposed project areas (Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area).

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If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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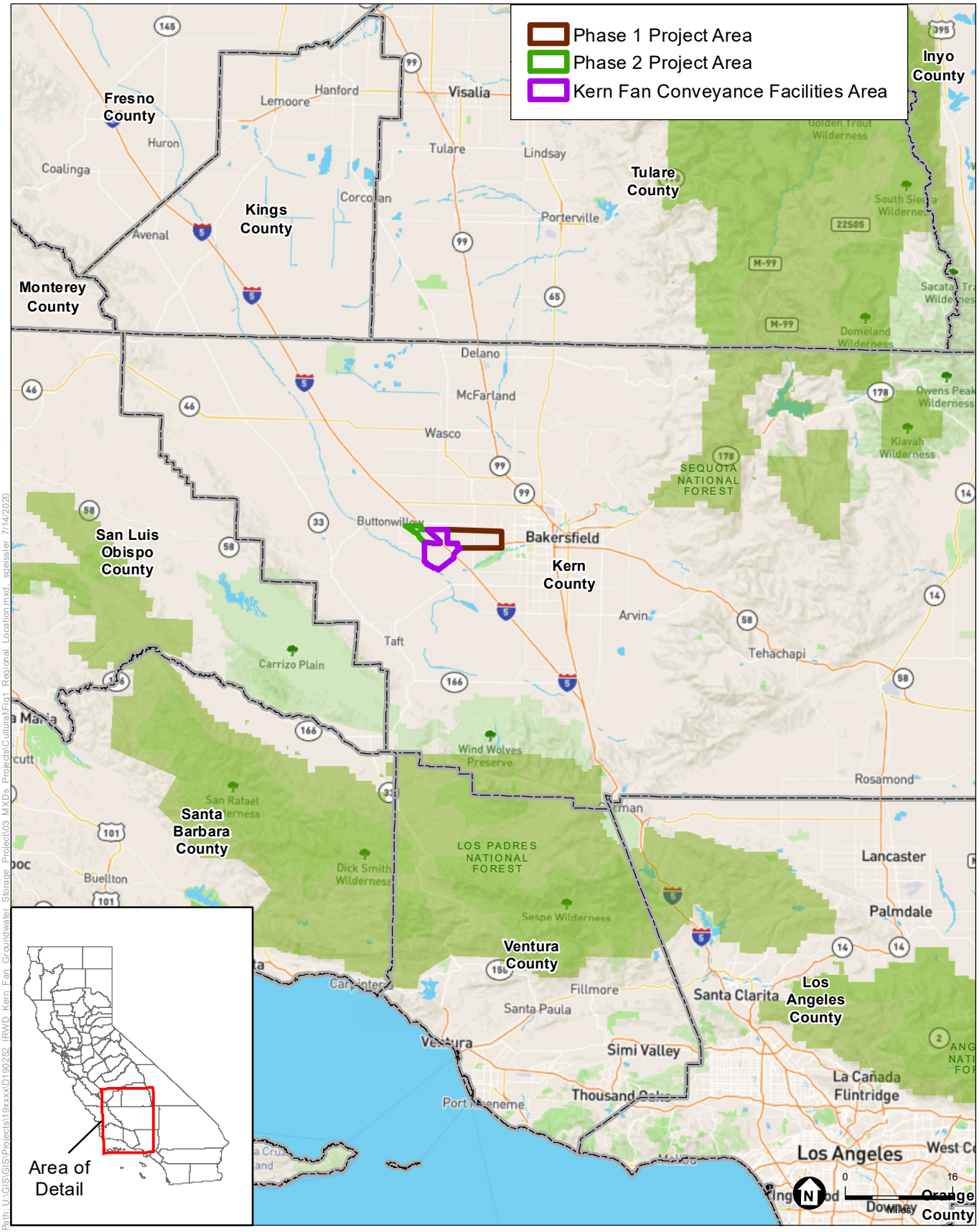
Figure 2 – Project Location
Figure 3 – Project Detail

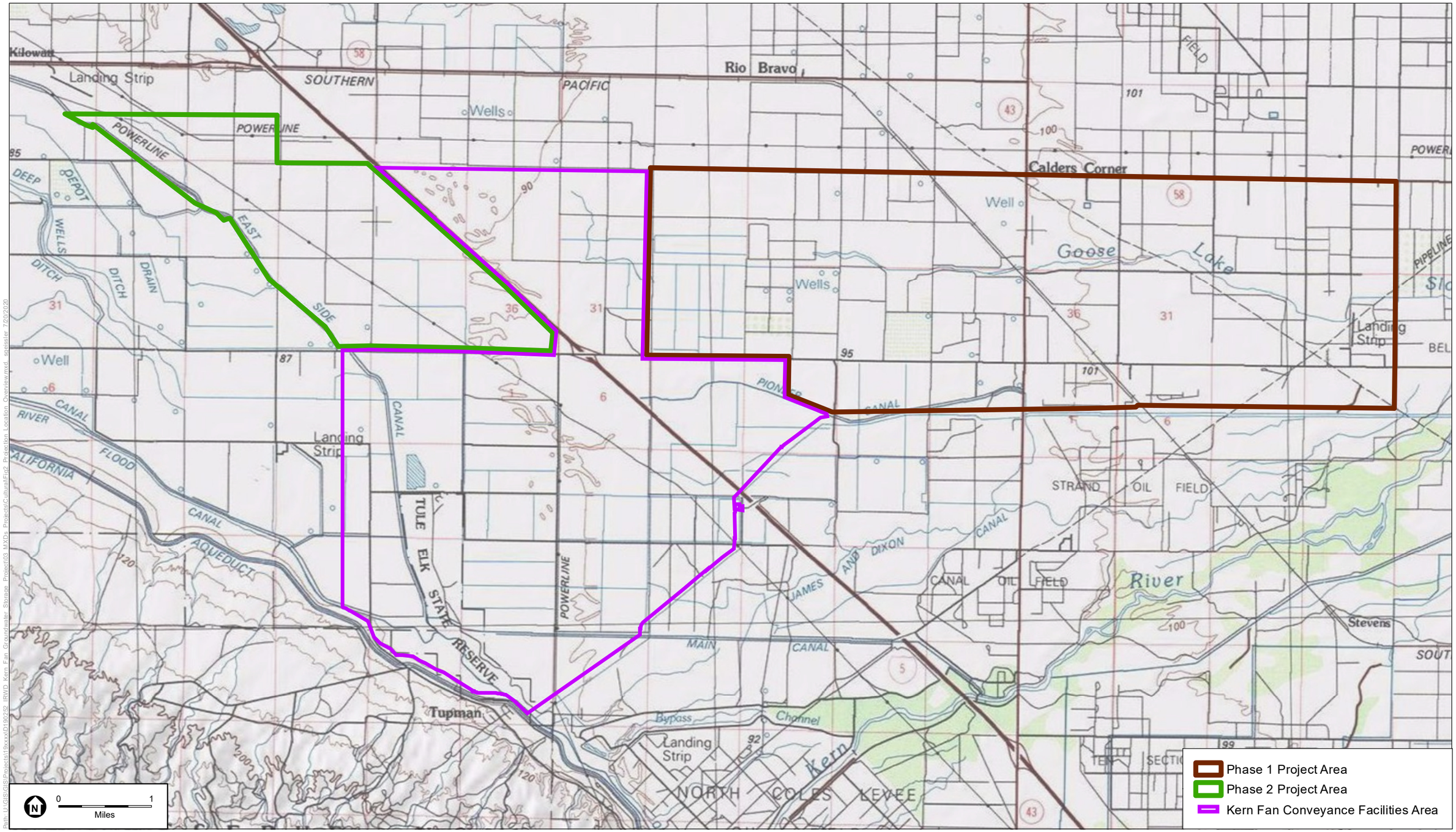


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



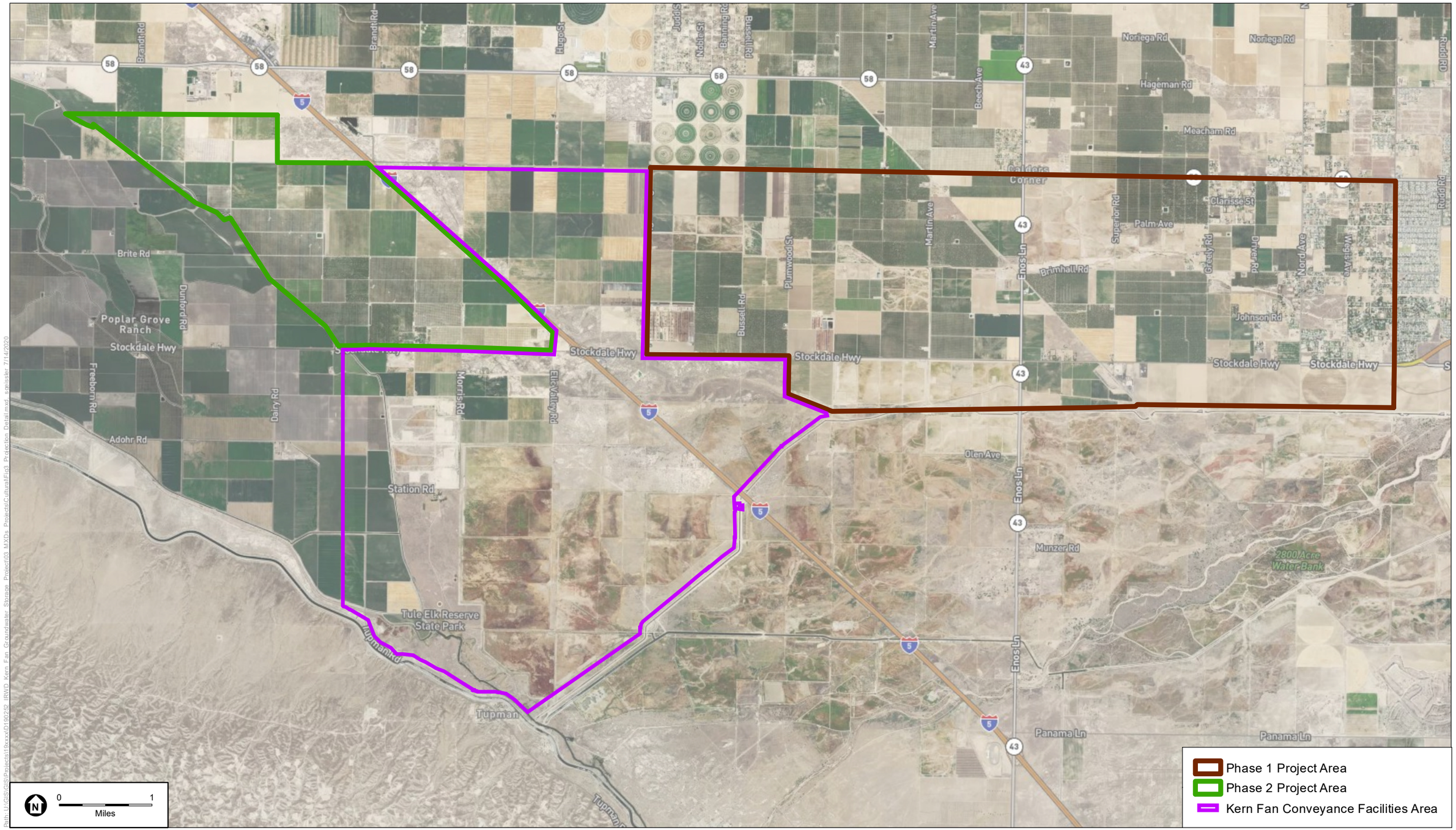
Path: U:\GIS\GIS\Projects\19xxxx\D190252 IRWD Kern Fan Groundwater Storage Project\03 MXDs Projects\Cultural\Fig2 Projection Location Overview.mxd, saeissler 7/20/2020

SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Robert L. Gomez, Jr., Tribal Chairperson
Tubatulabals of Kern Valley
P.O. Box 226
Lake Isabella, CA 93240

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Tribal Chairperson Gomez:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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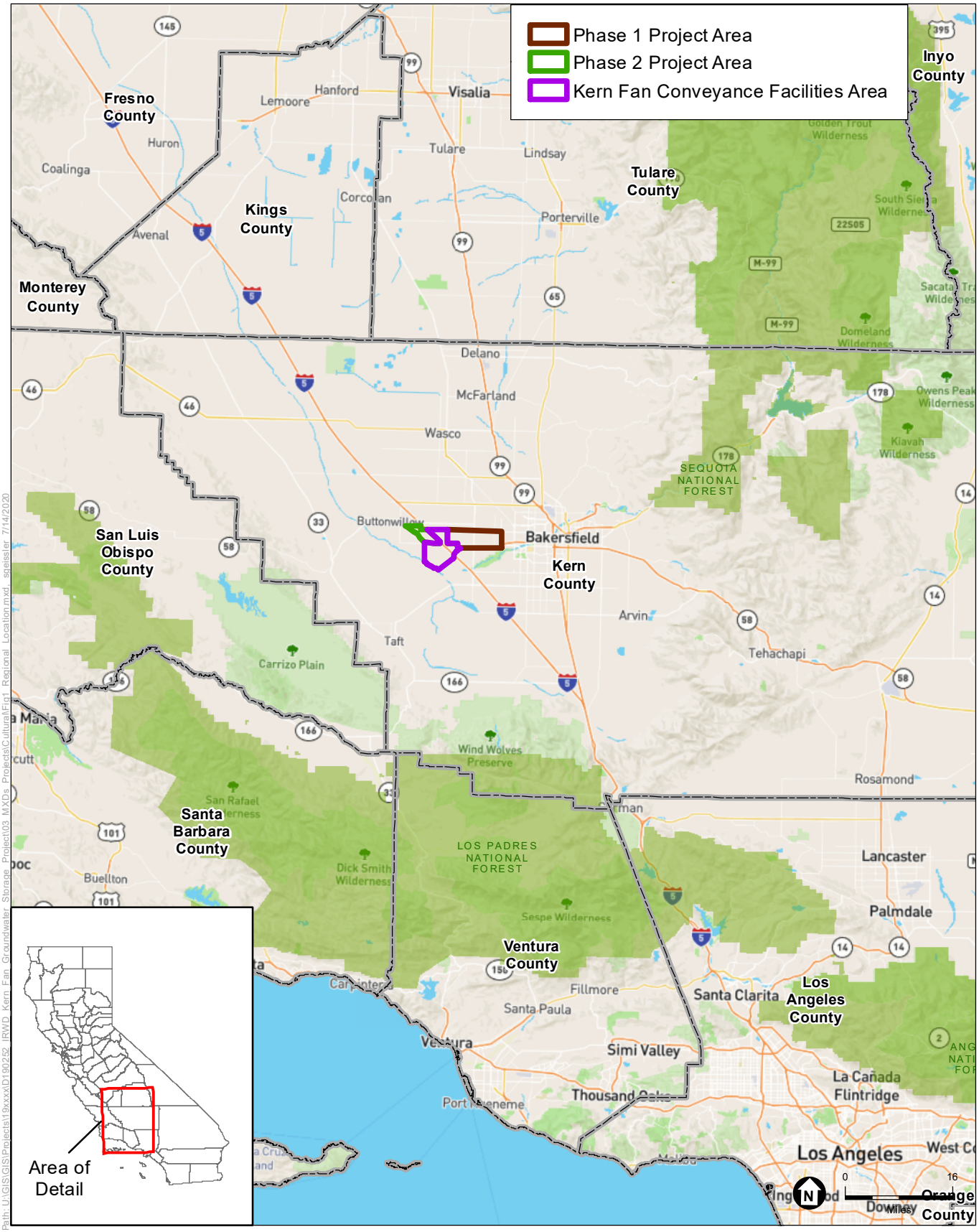
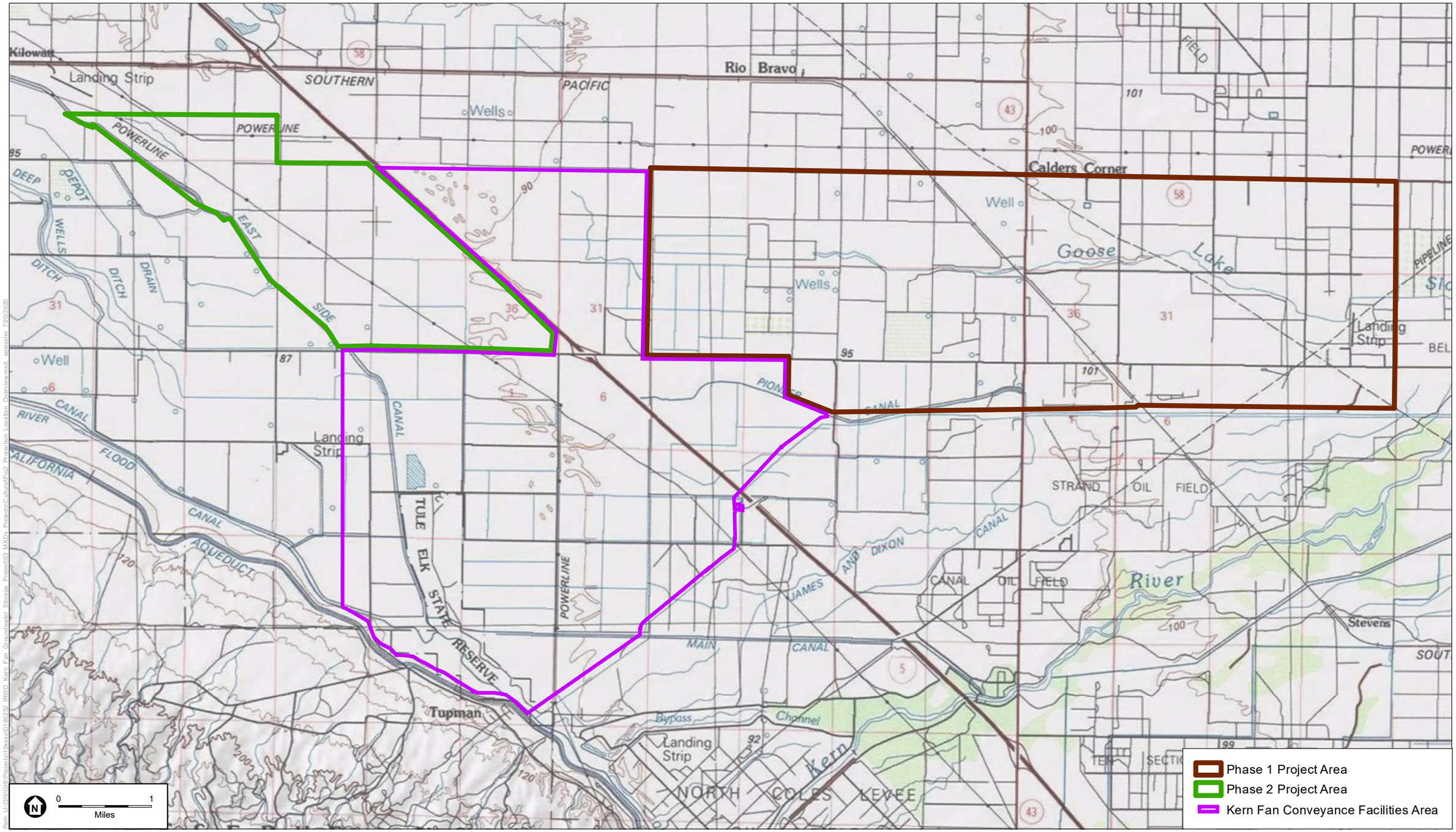


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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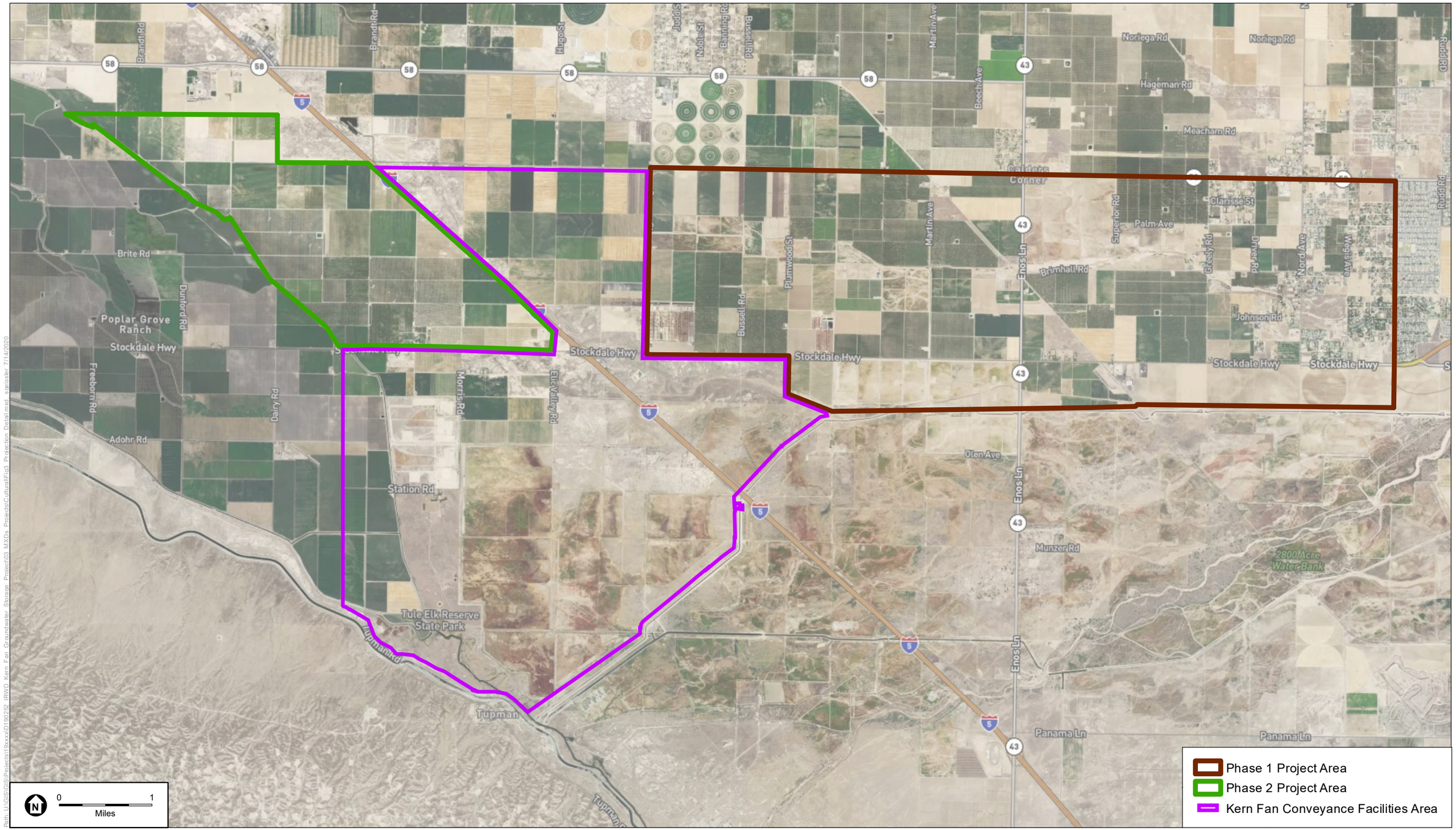
Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Danelle Gutierrez, Tribal Historic Preservation Officer
Big Pine Paiute Tribe of the Owens Valley
P.O. Box 700
Big Pine, CA 93513

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Gutierrez:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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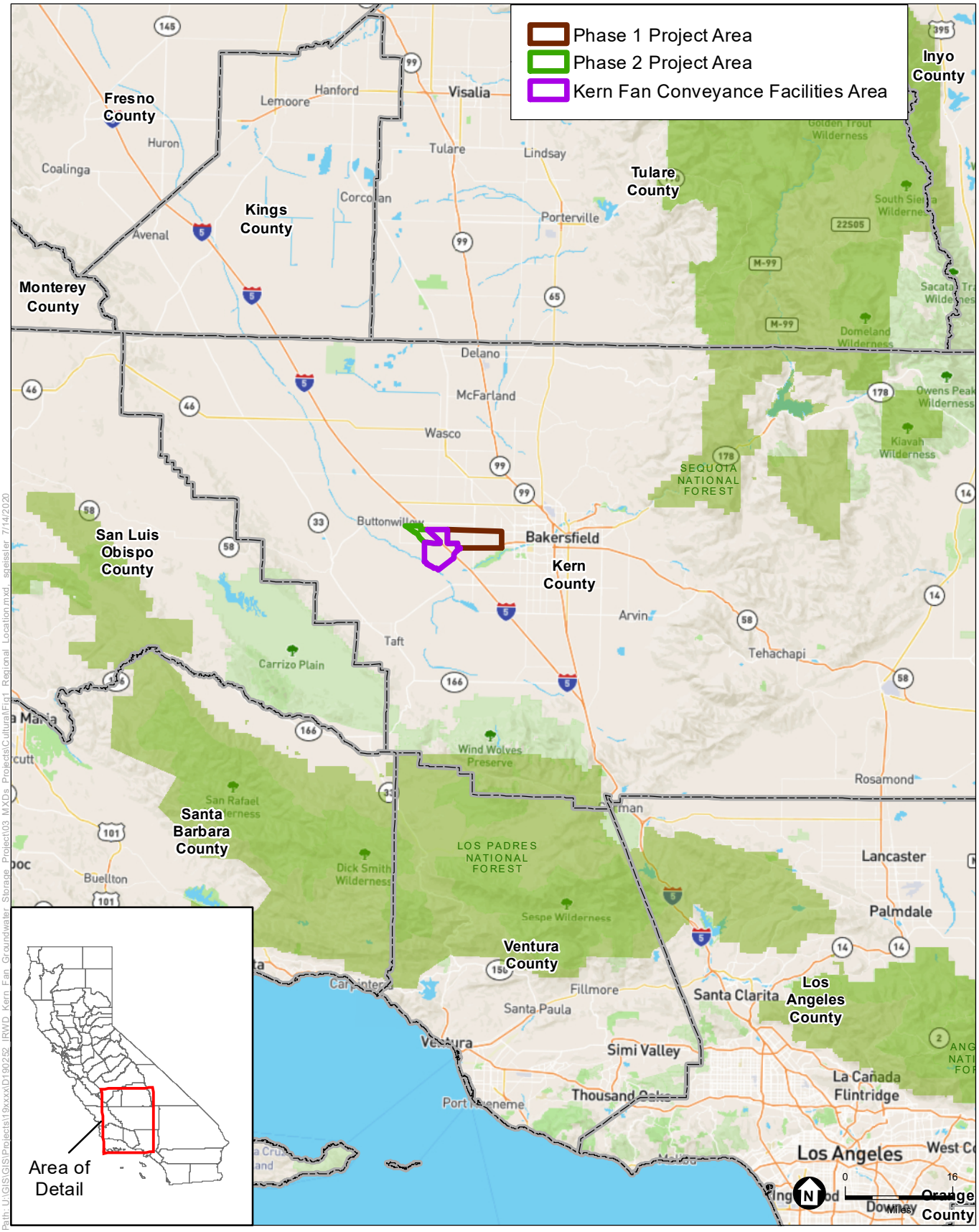
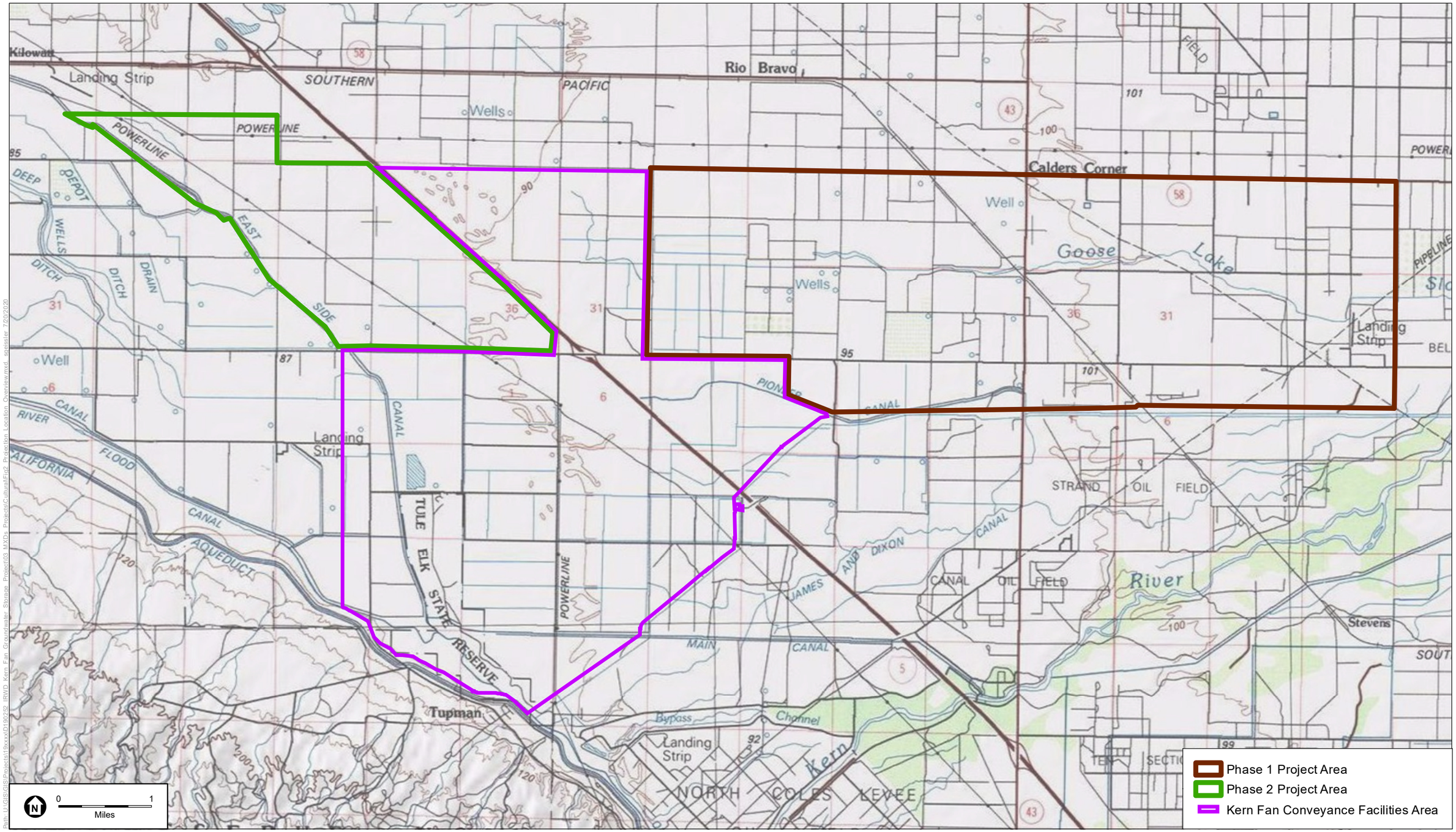


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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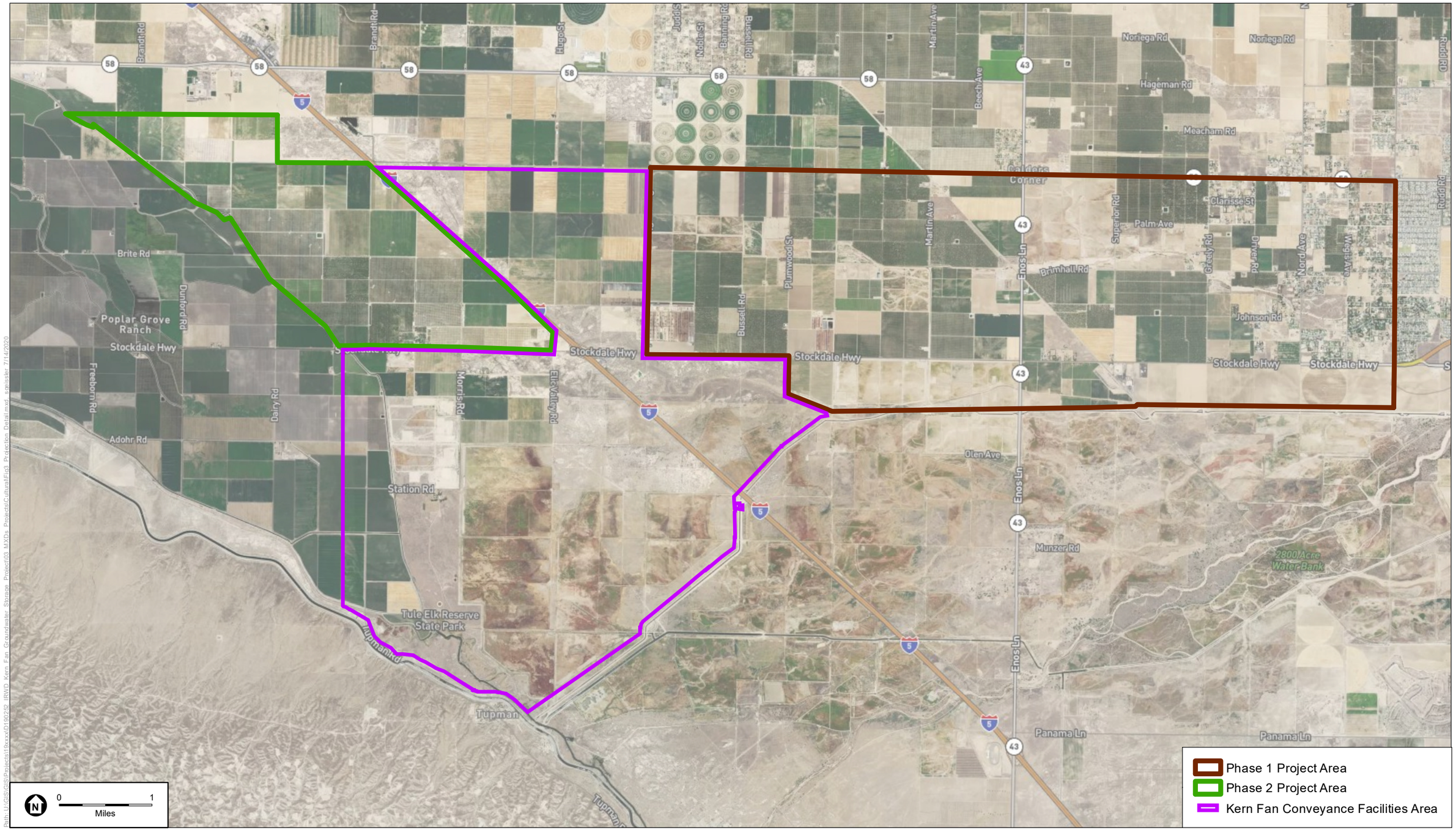
Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Brandy Kendricks
Kern Valley Indian Community
30741 Foxridge Court
Tehachapi, CA 93561

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Kendricks:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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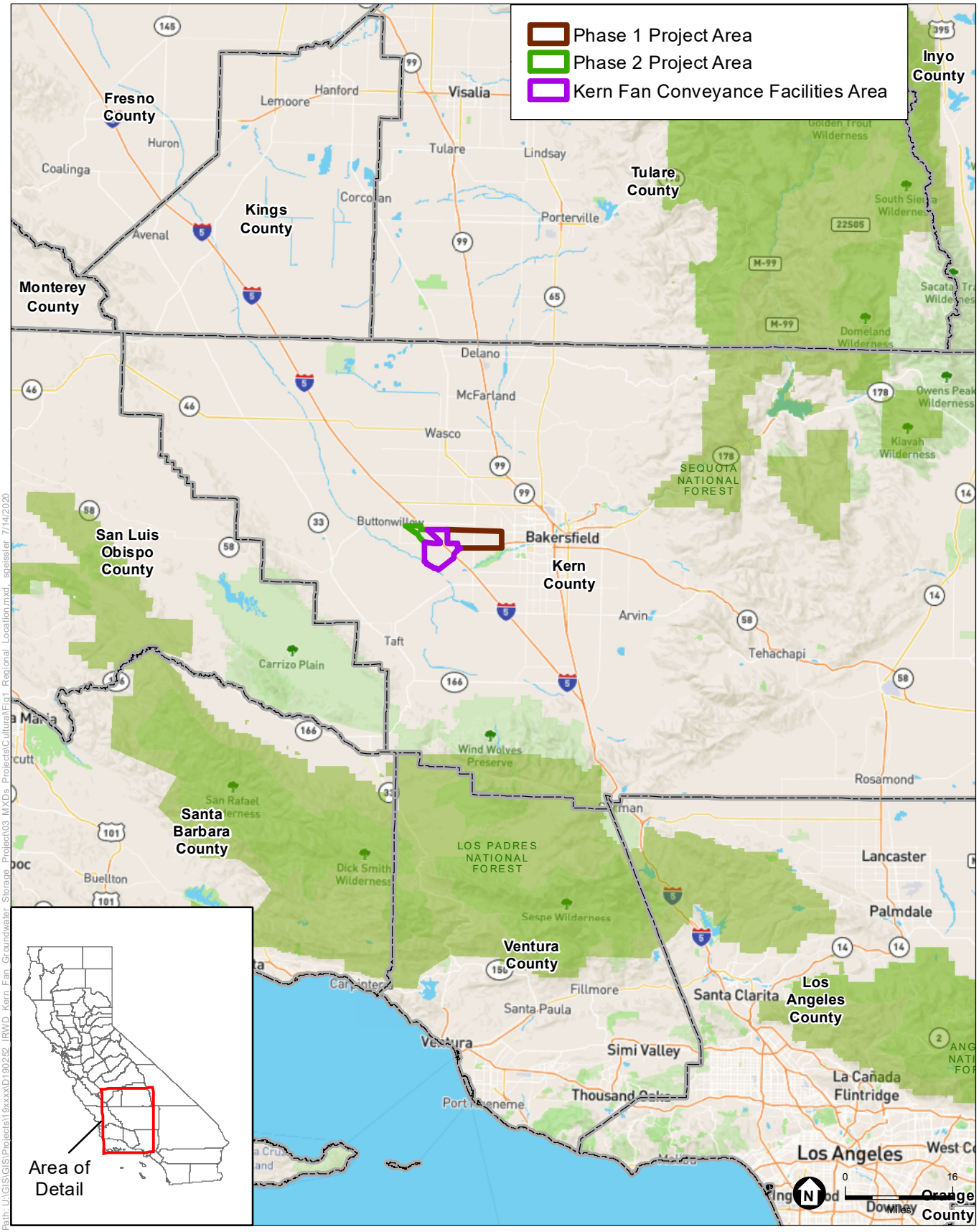
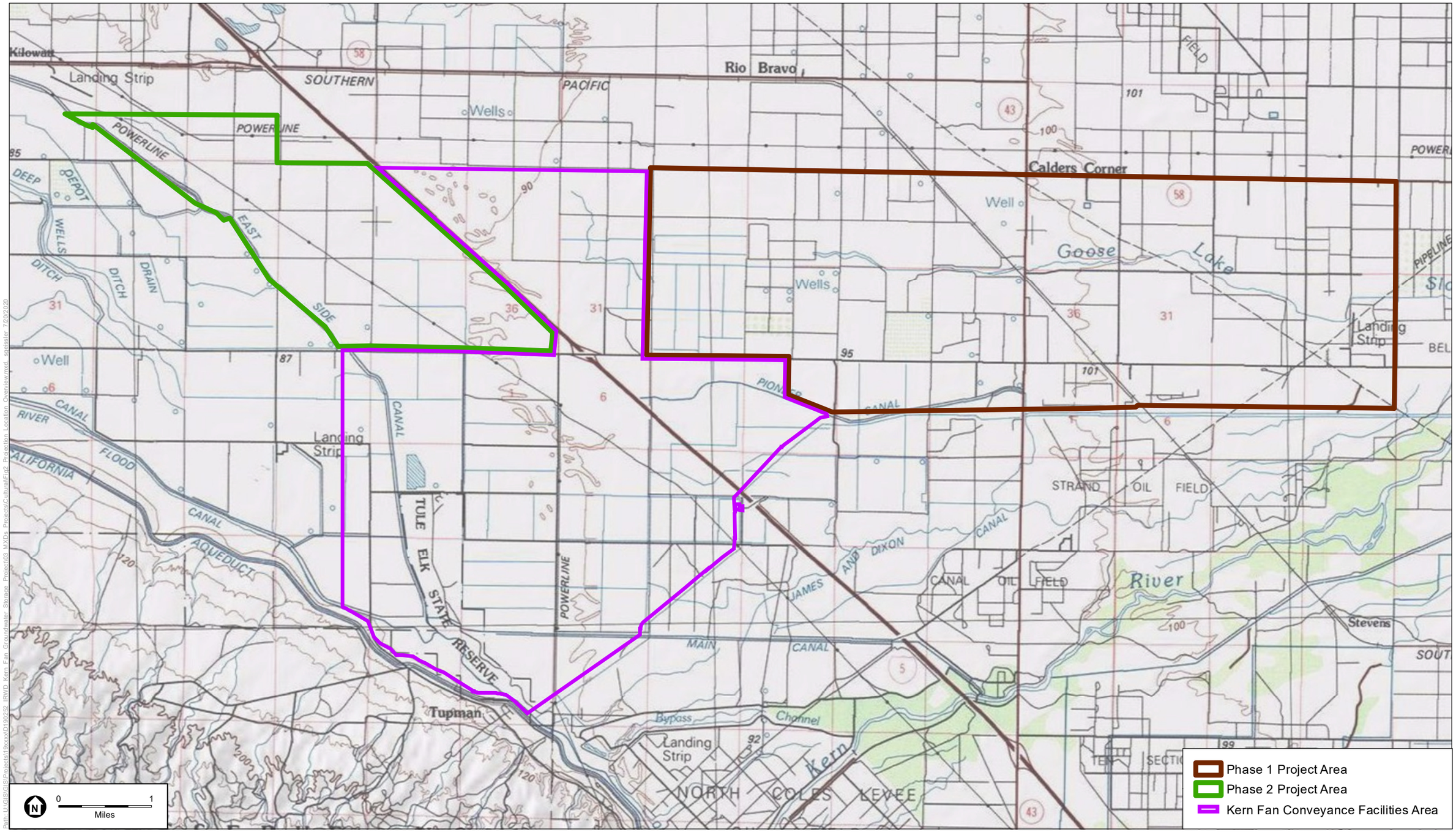


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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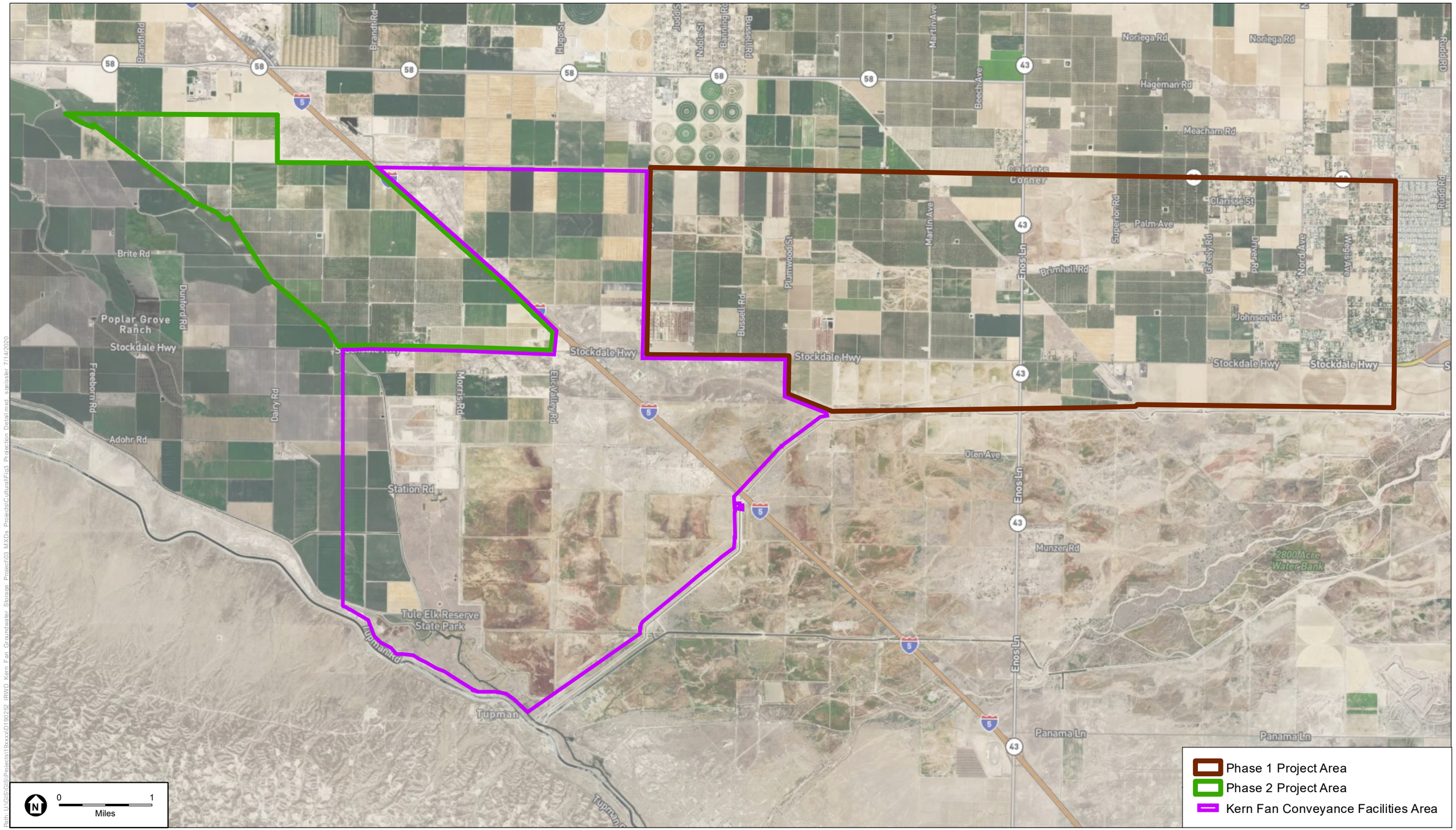
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Sally Manning, Environmental Director
Big Pine Paiute Tribe of the Owens Valley
P.O. Box 700
Big Pine, CA 93513

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Manning:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

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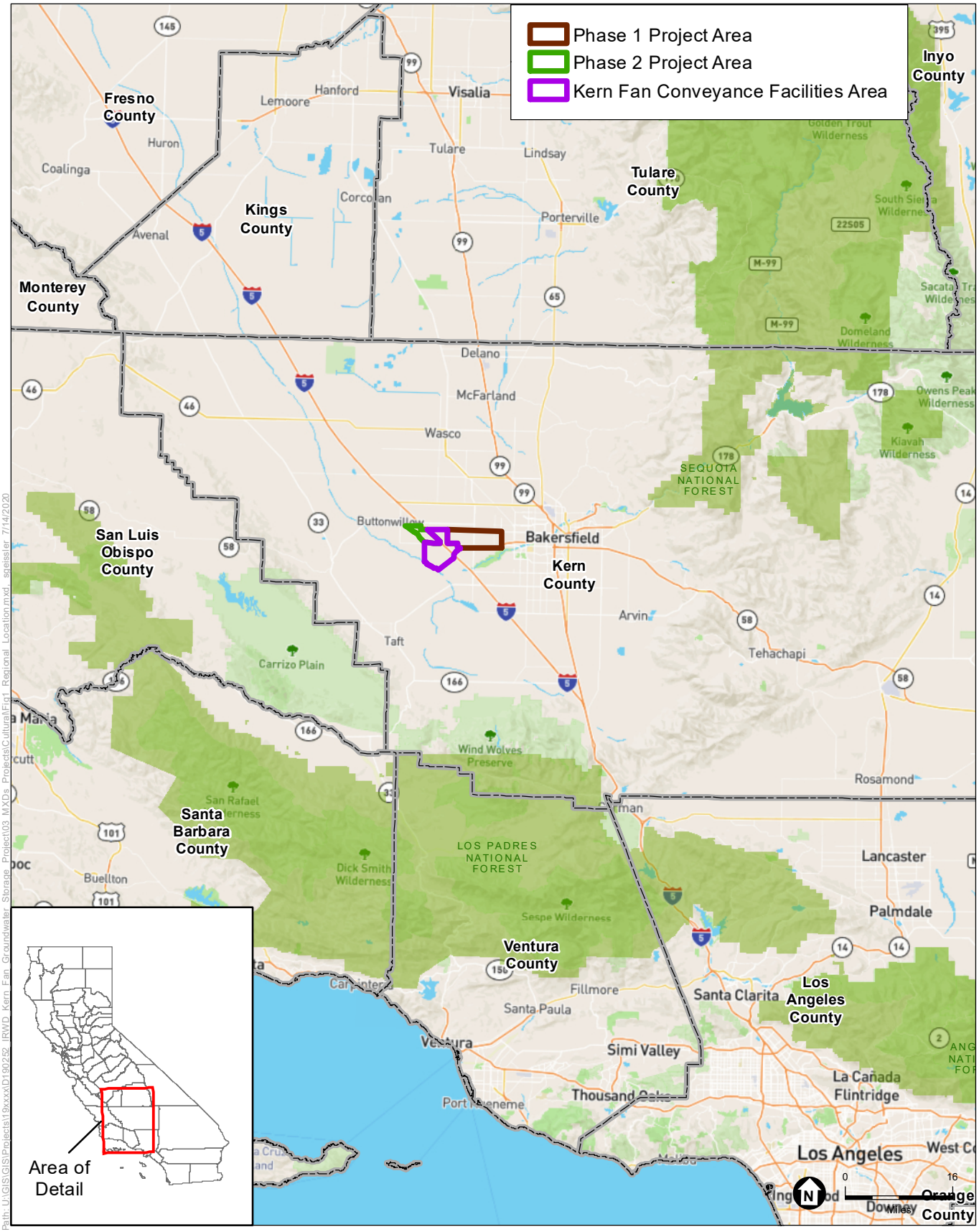
Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

Enclosures: Figure 1 – Regional Location
Figure 2 – Project Location
Figure 3 – Project Detail

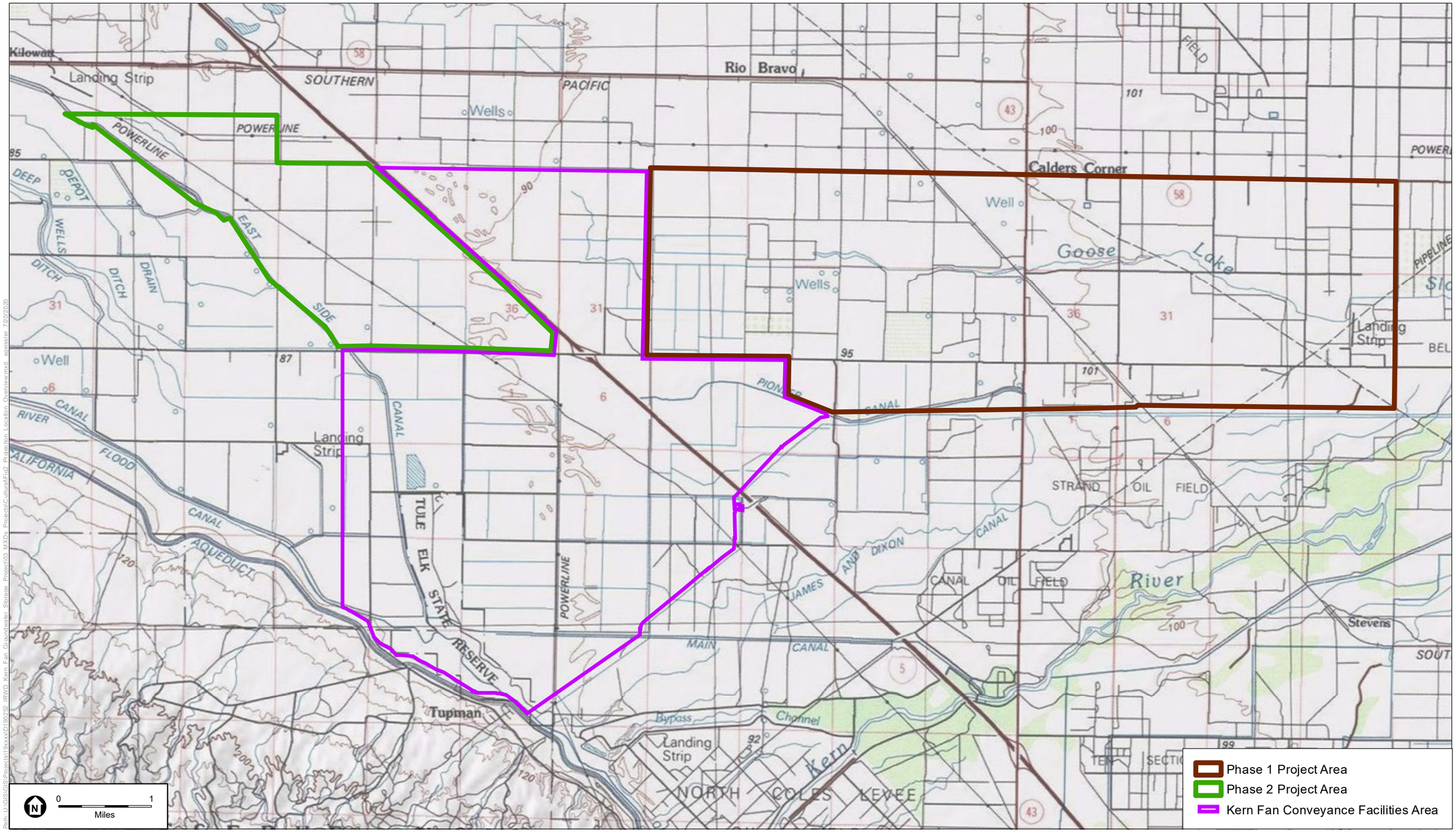


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



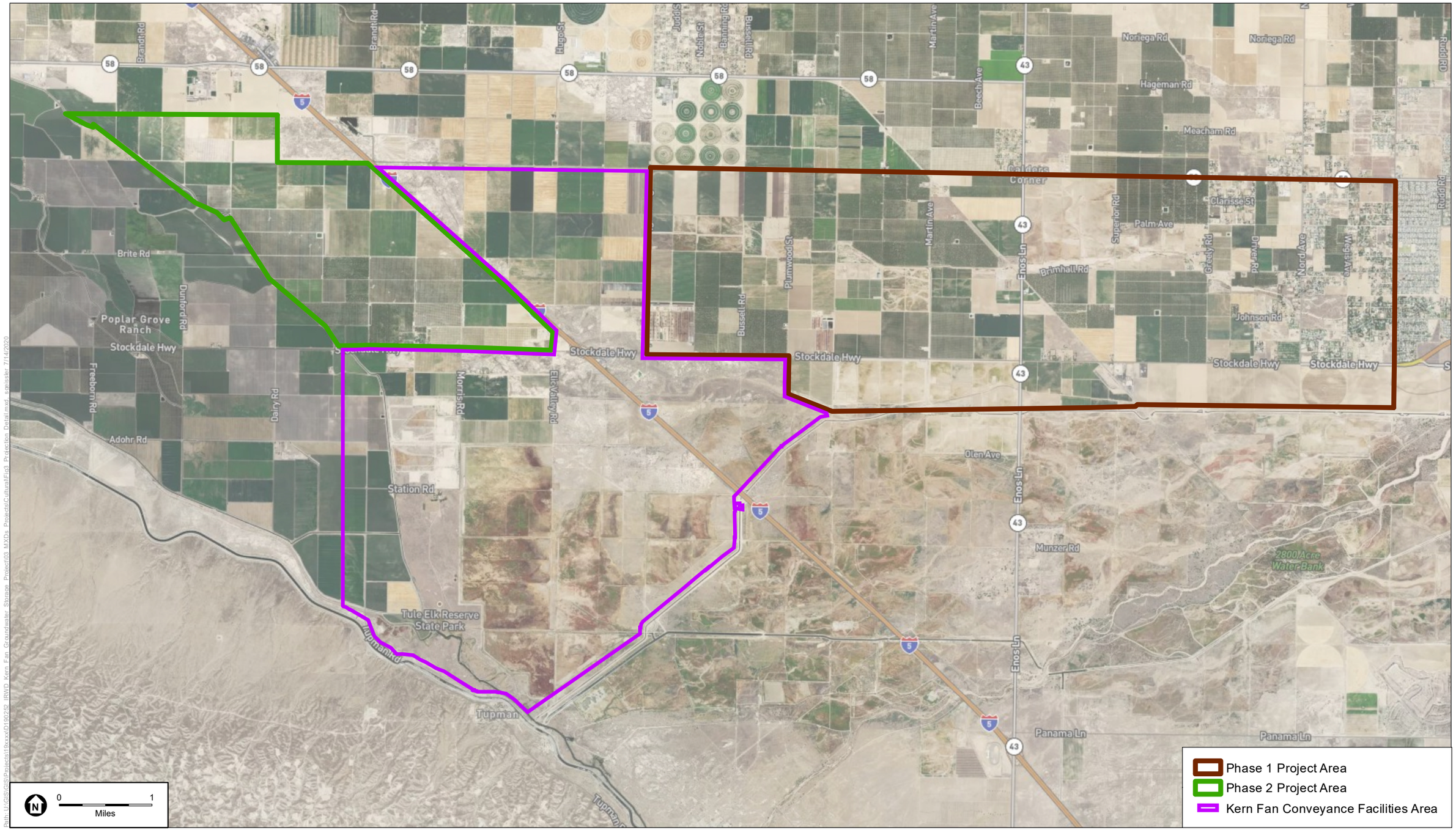
Path: U:\GIS\GIS\Projects\19xxxx\D190252 IRWD Kern Fan Groundwater Storage Project\03 MXDs Projects\Cultural\Fig2 Projection Location Overview.mxd, saeissler 7/20/2020

SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Jessica Mauck, Director-CRM Department
San Manuel Band of Mission Indians
26569 Community Center Drive
Highland, CA 92346

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Mauck:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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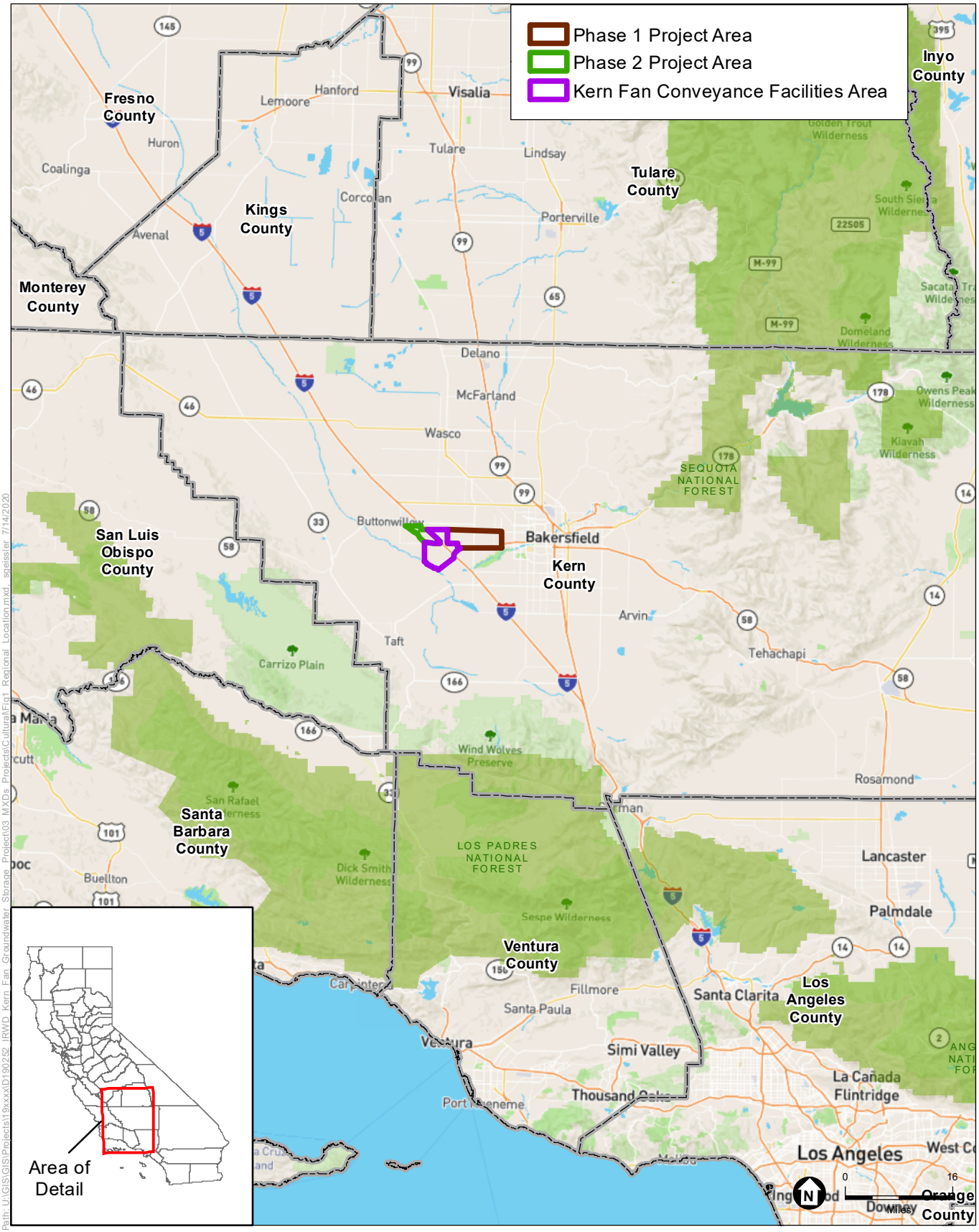
Figure 2 – Project Location
Figure 3 – Project Detail

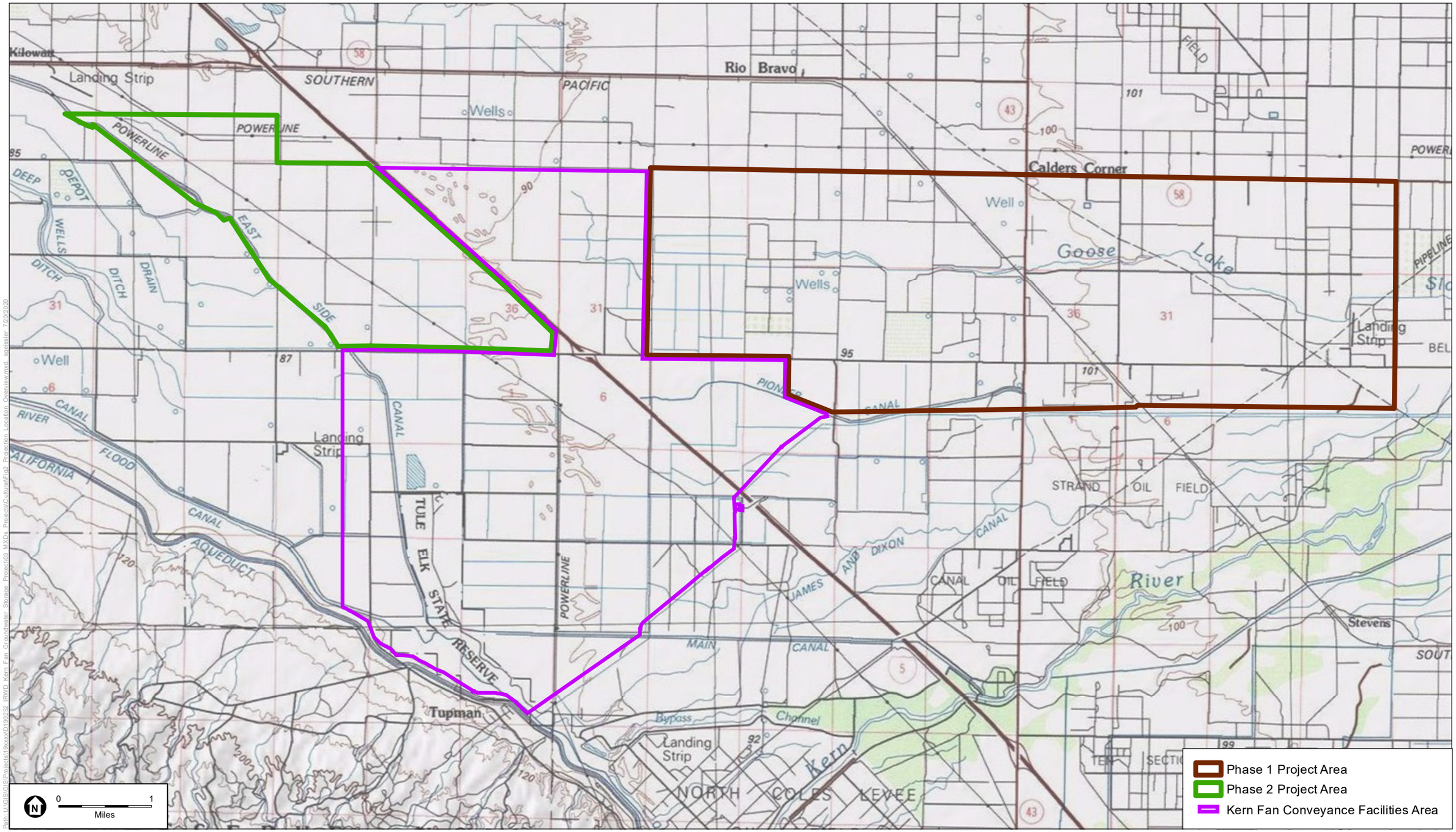


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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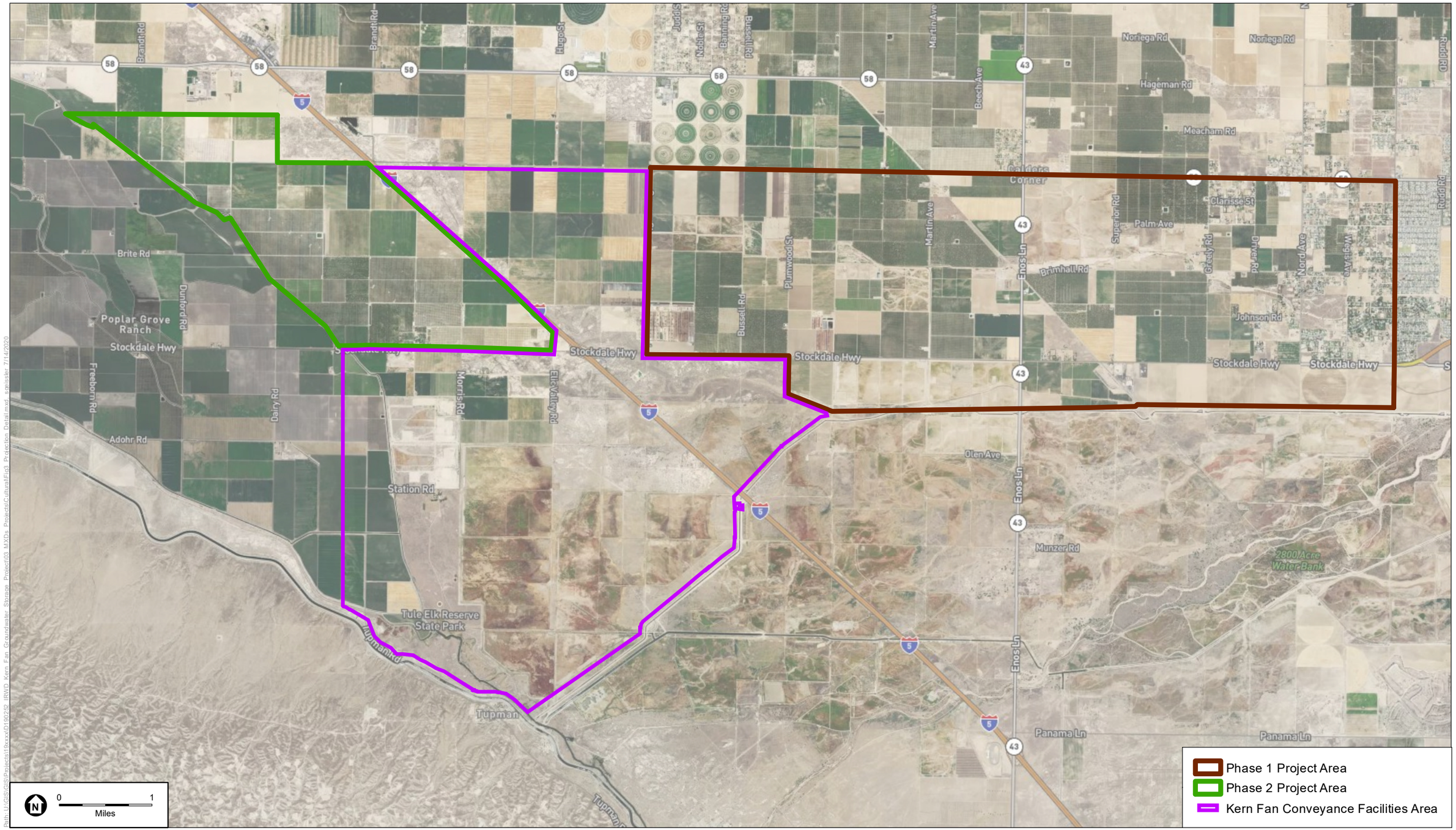
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Neil Pevron, Chairperson
Tule River Indian Tribe
P.O. Box 589
Porterville, CA 93258

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Pevron:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

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A search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was conducted on May 6, 2020. The results were negative, indicating that the NAHC does not have any sacred sites or Native American cultural resources on file within the proposed project areas (Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area).

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If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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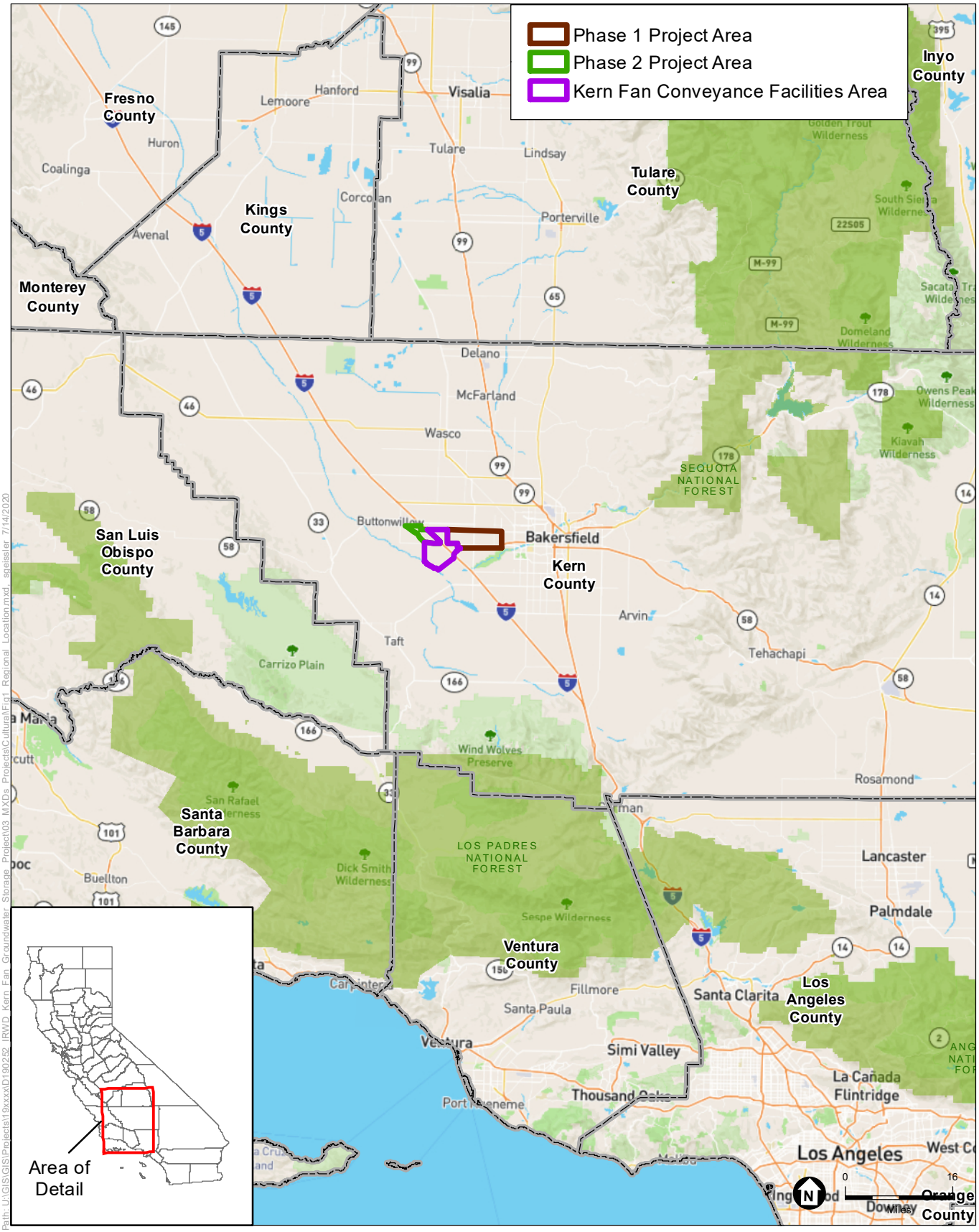
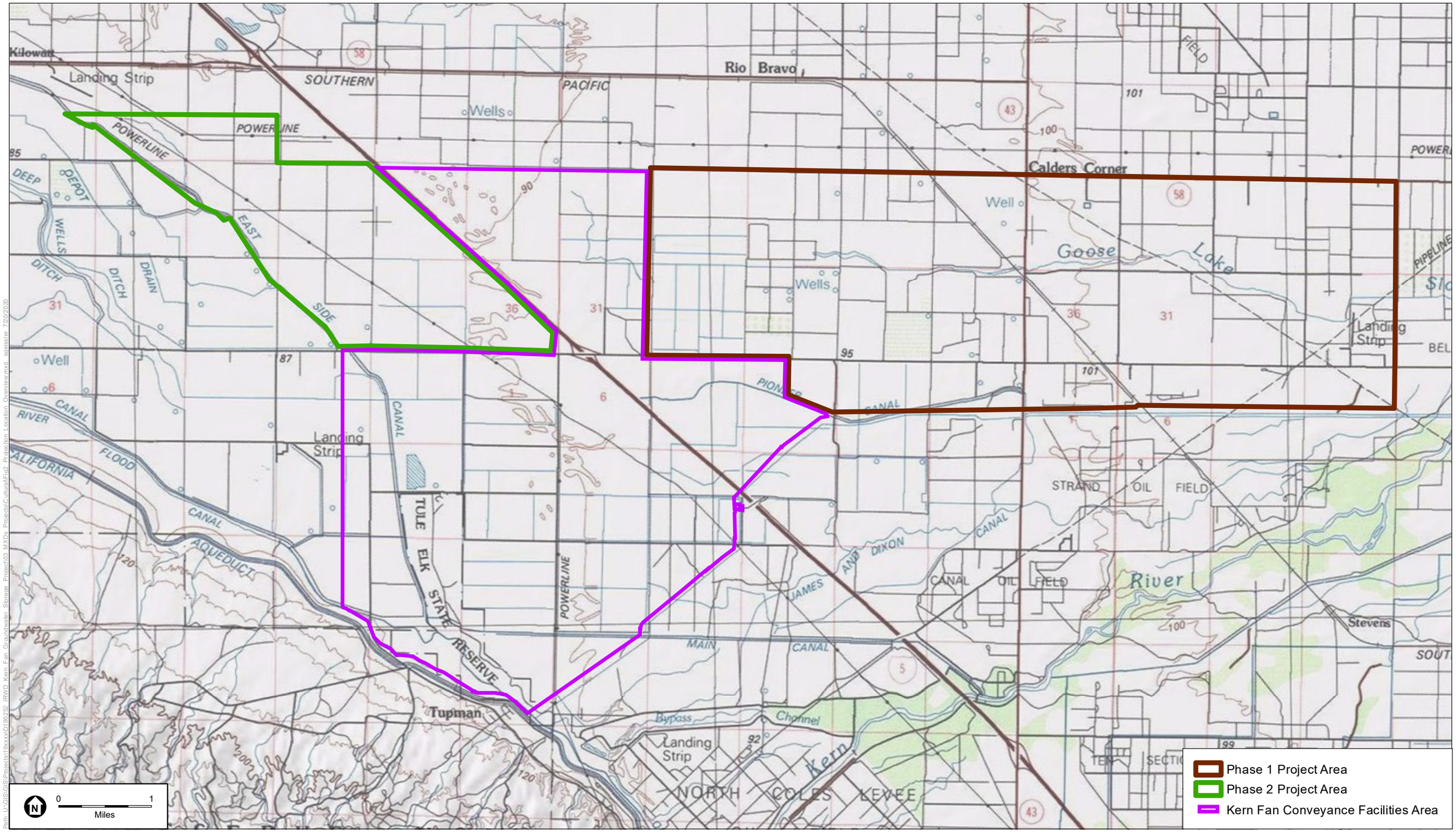


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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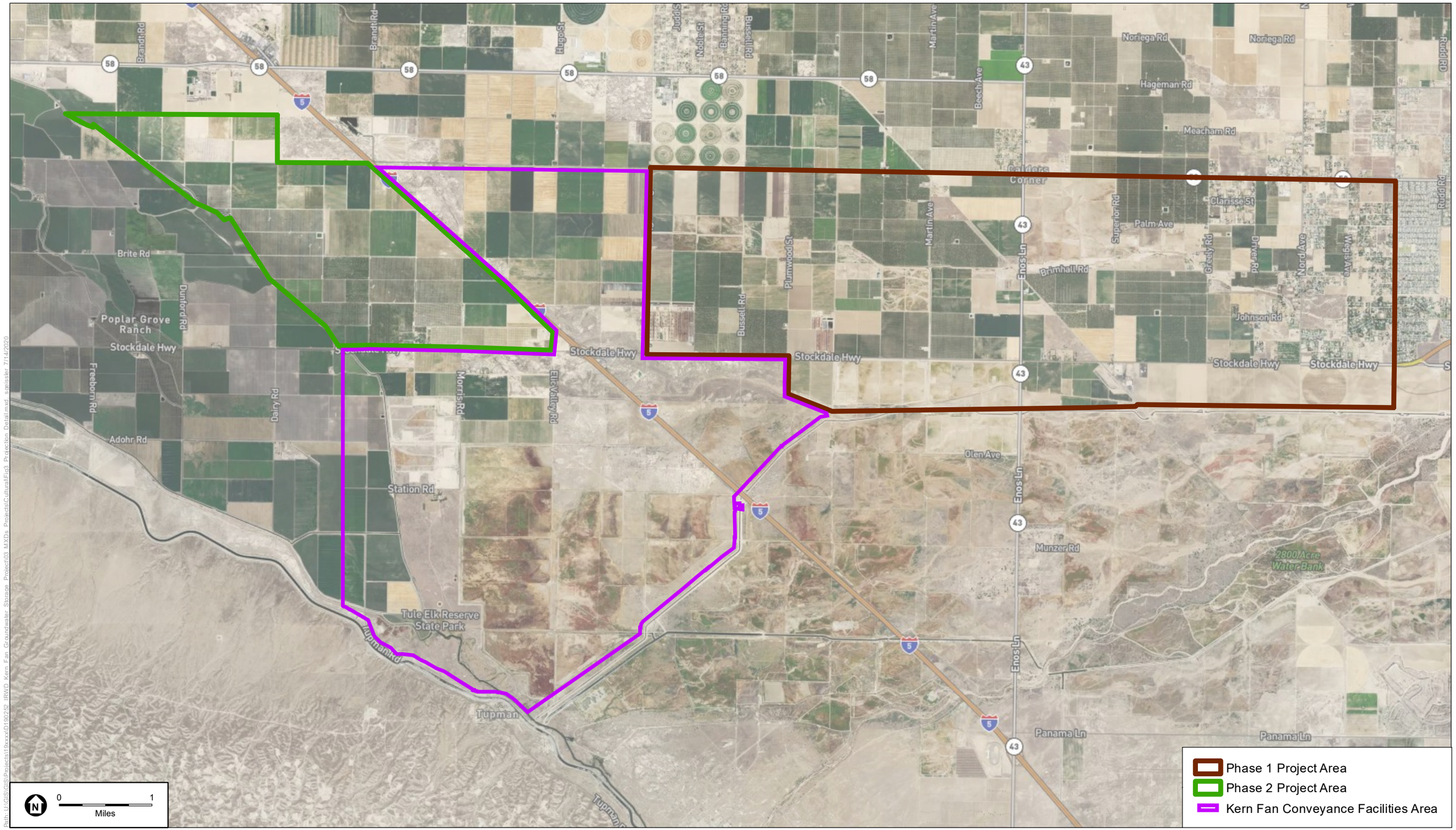
Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Julio Quair, Chairperson
Chumash Council of Bakersfield
729 Texas Street
Bakersfield, CA 93307

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Quair:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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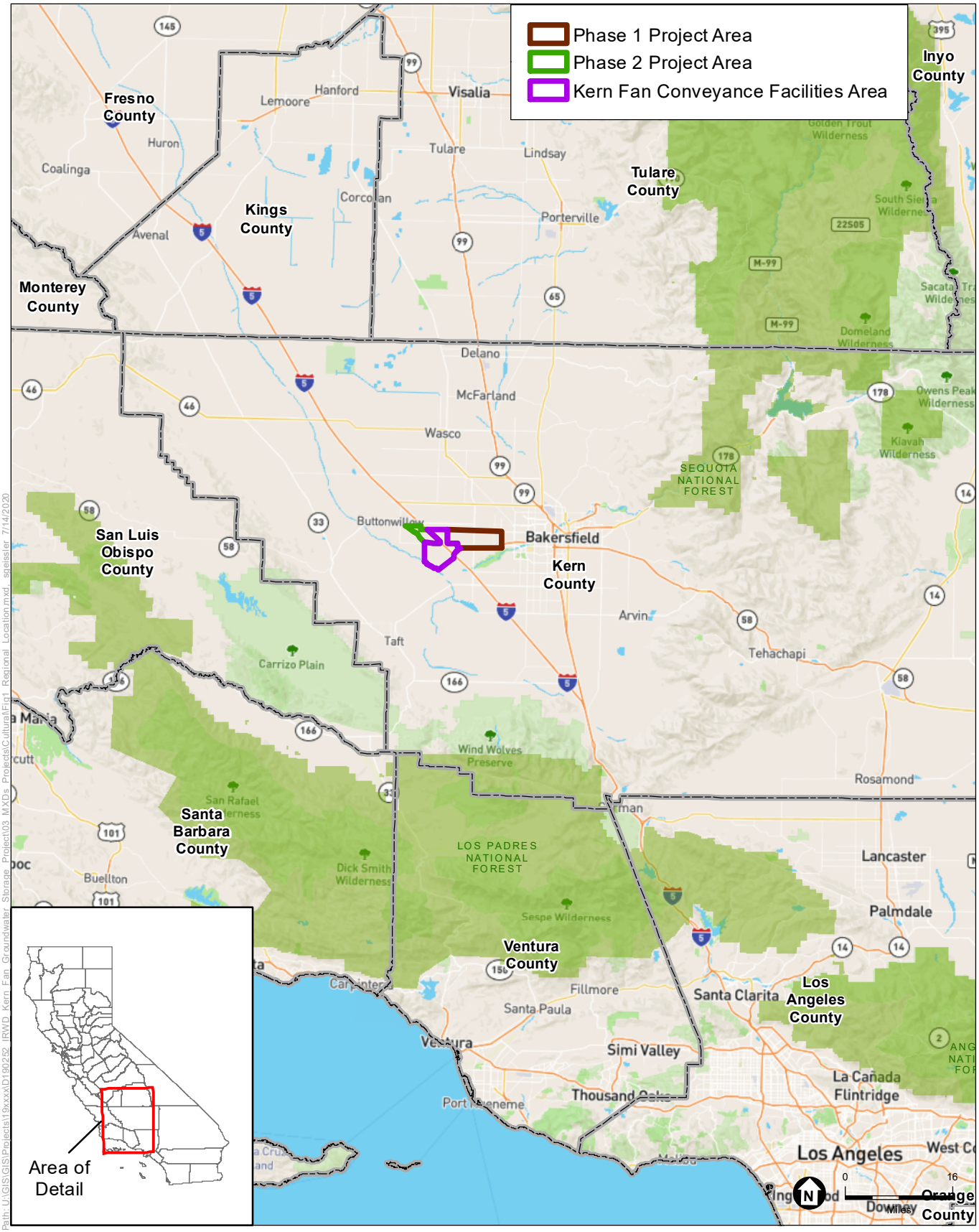
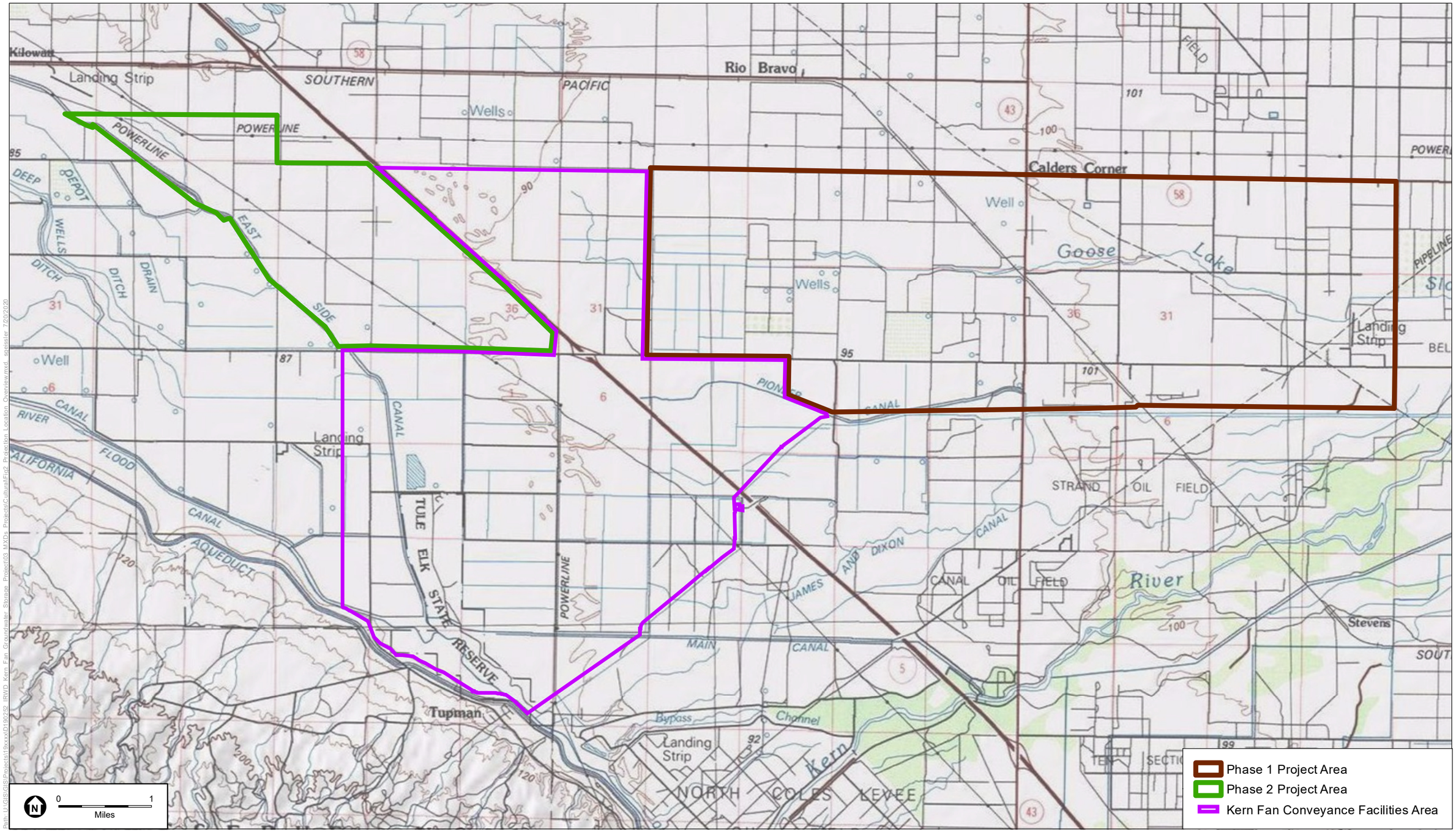


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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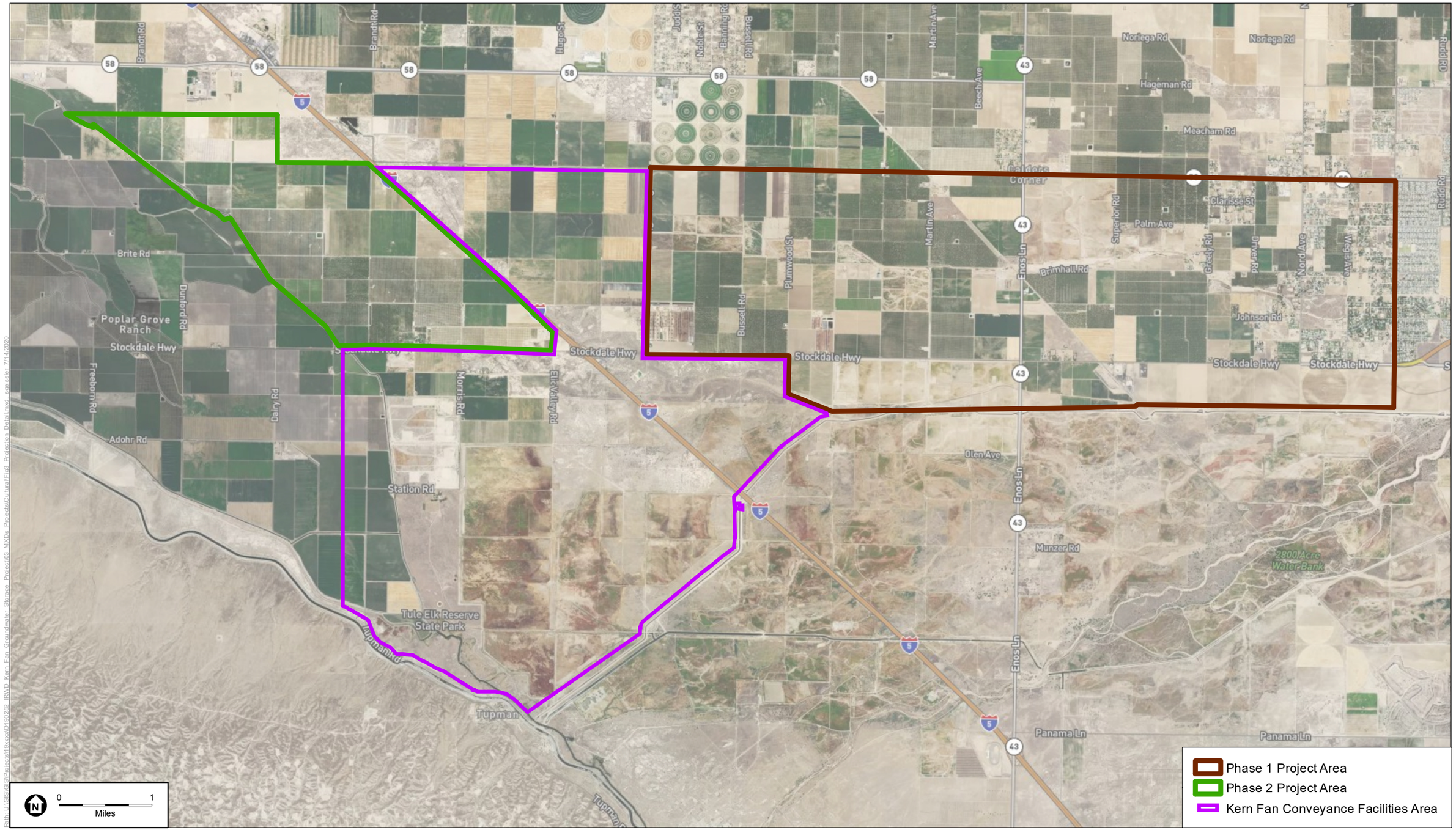
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

James Rambeau, Sr., Chairperson
Big Pine Paiute Tribe of the Owens Valley
P.O. Box 700
Big Pine, CA 93513

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Rambeau:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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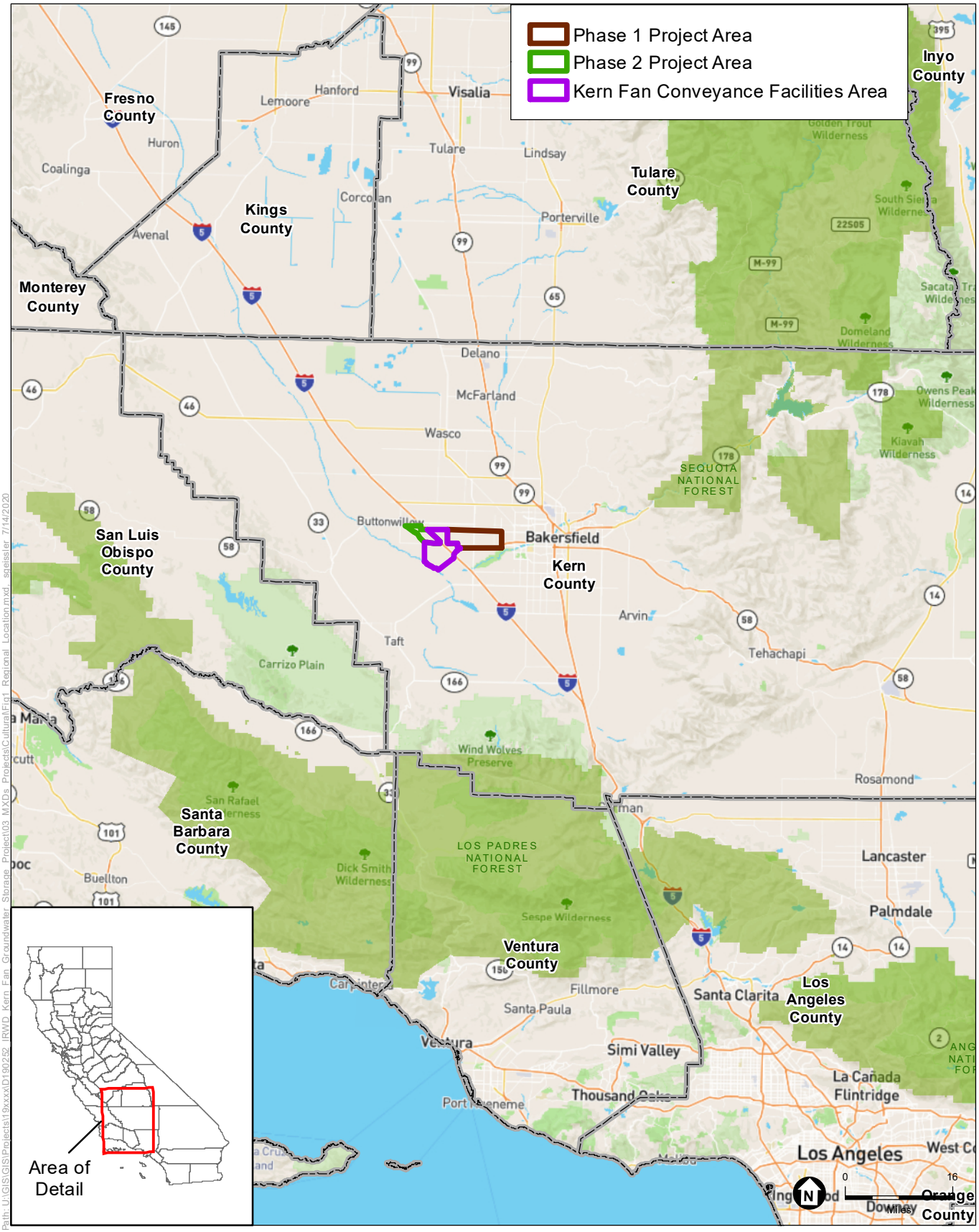
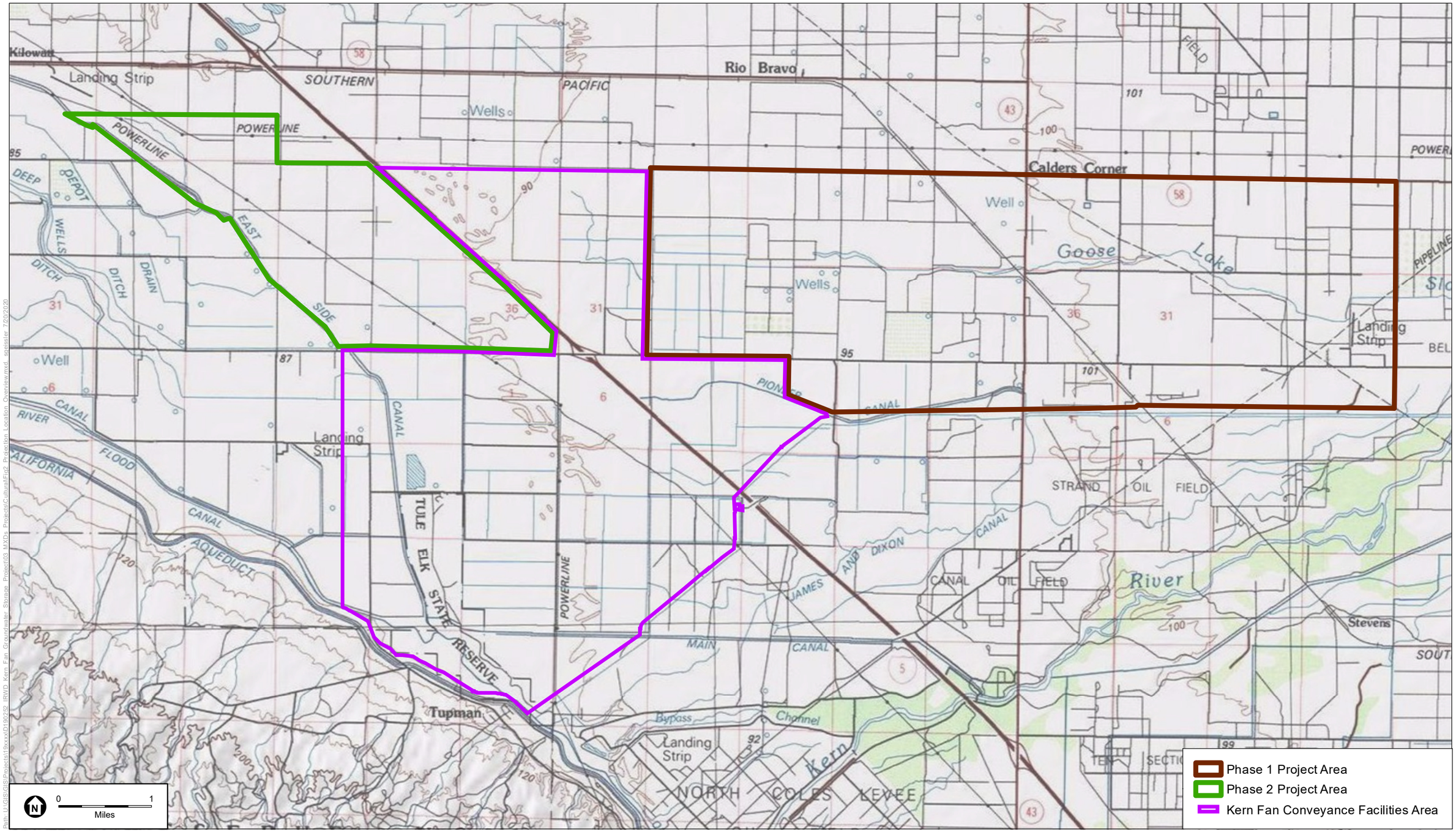


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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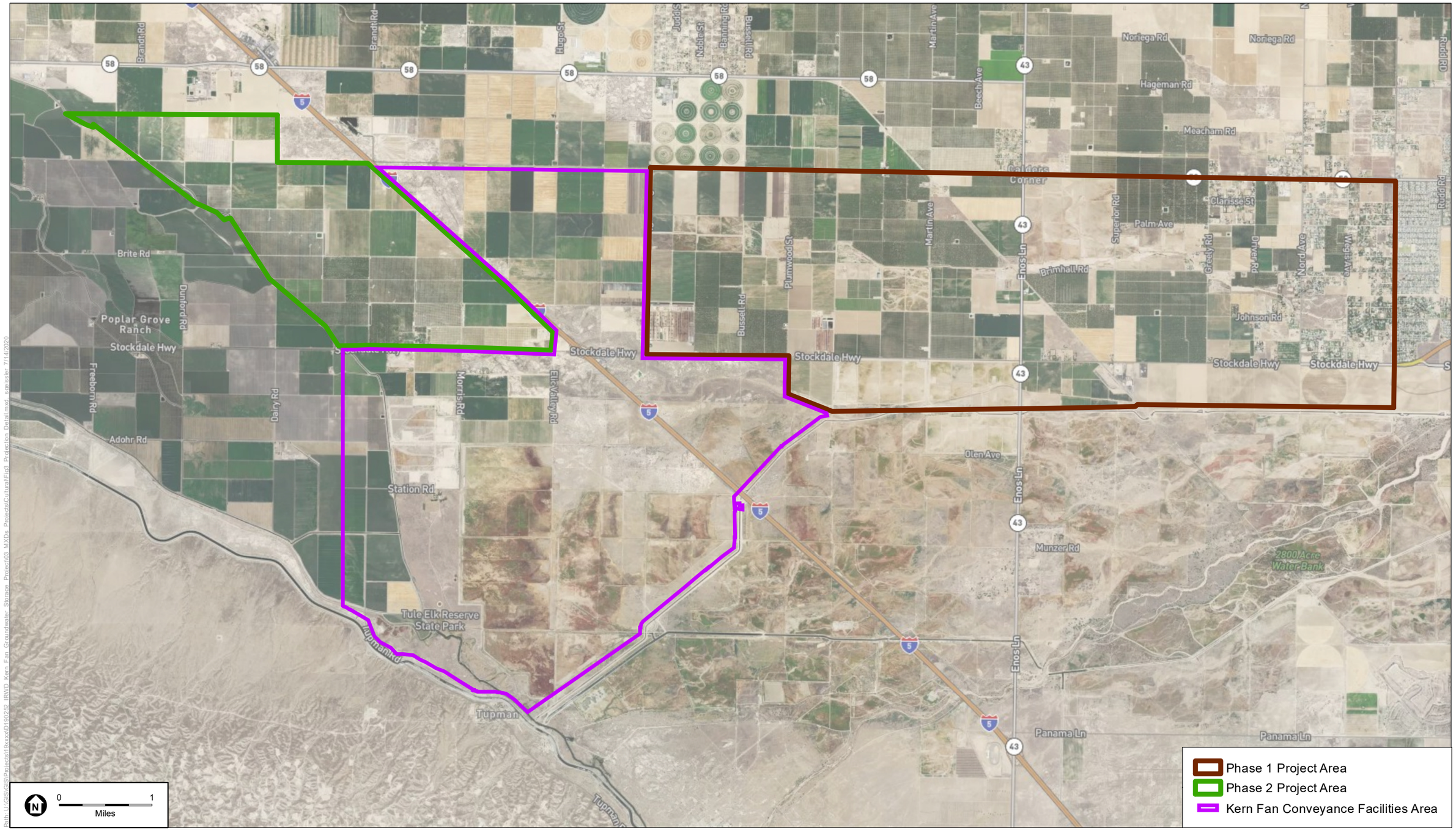
Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Colin Rambo, CRM Tech
Tejon Indian Tribe
P.O. Box 640
Arvin, CA 93203

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Mr. Rambo:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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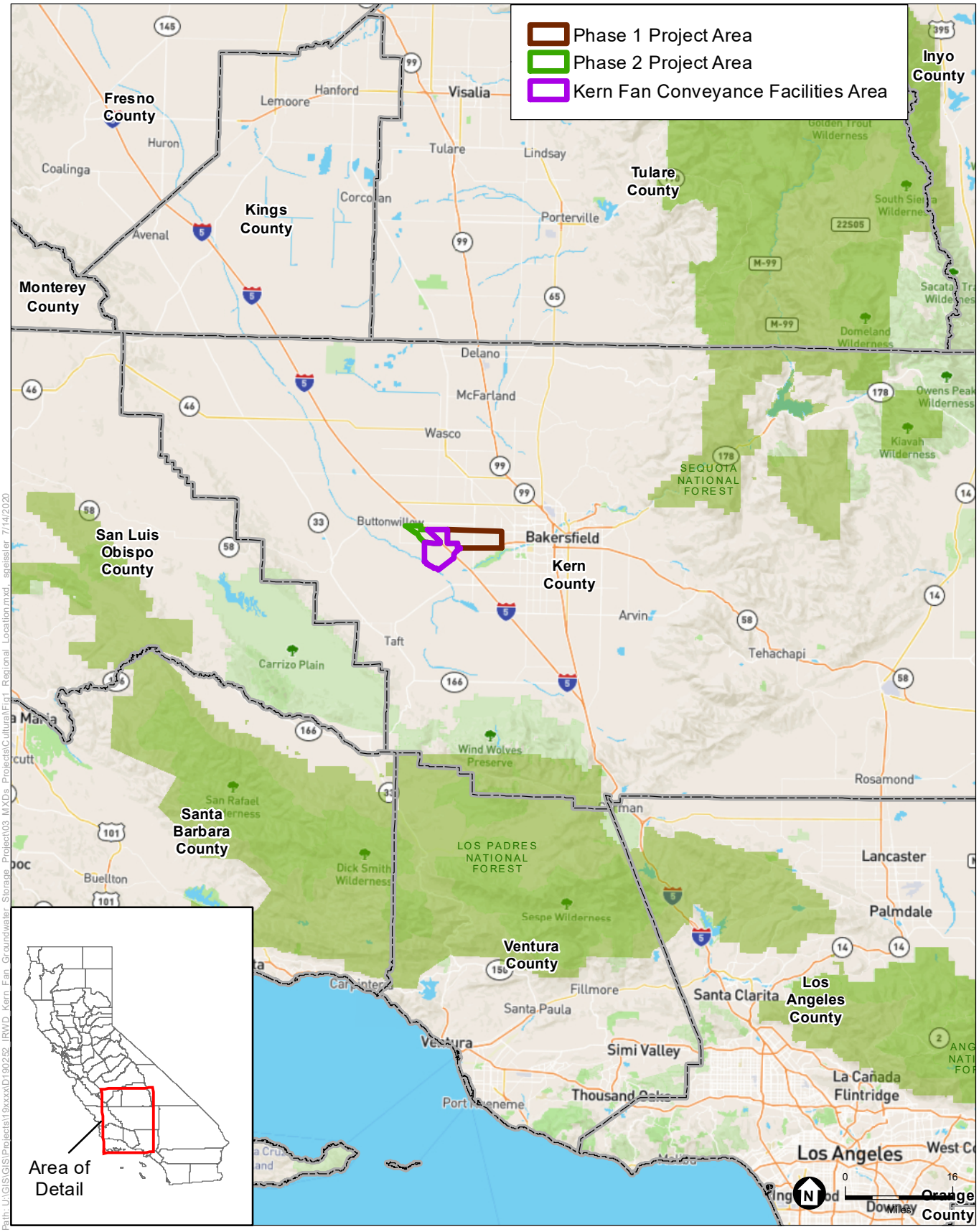
Figure 2 – Project Location
Figure 3 – Project Detail

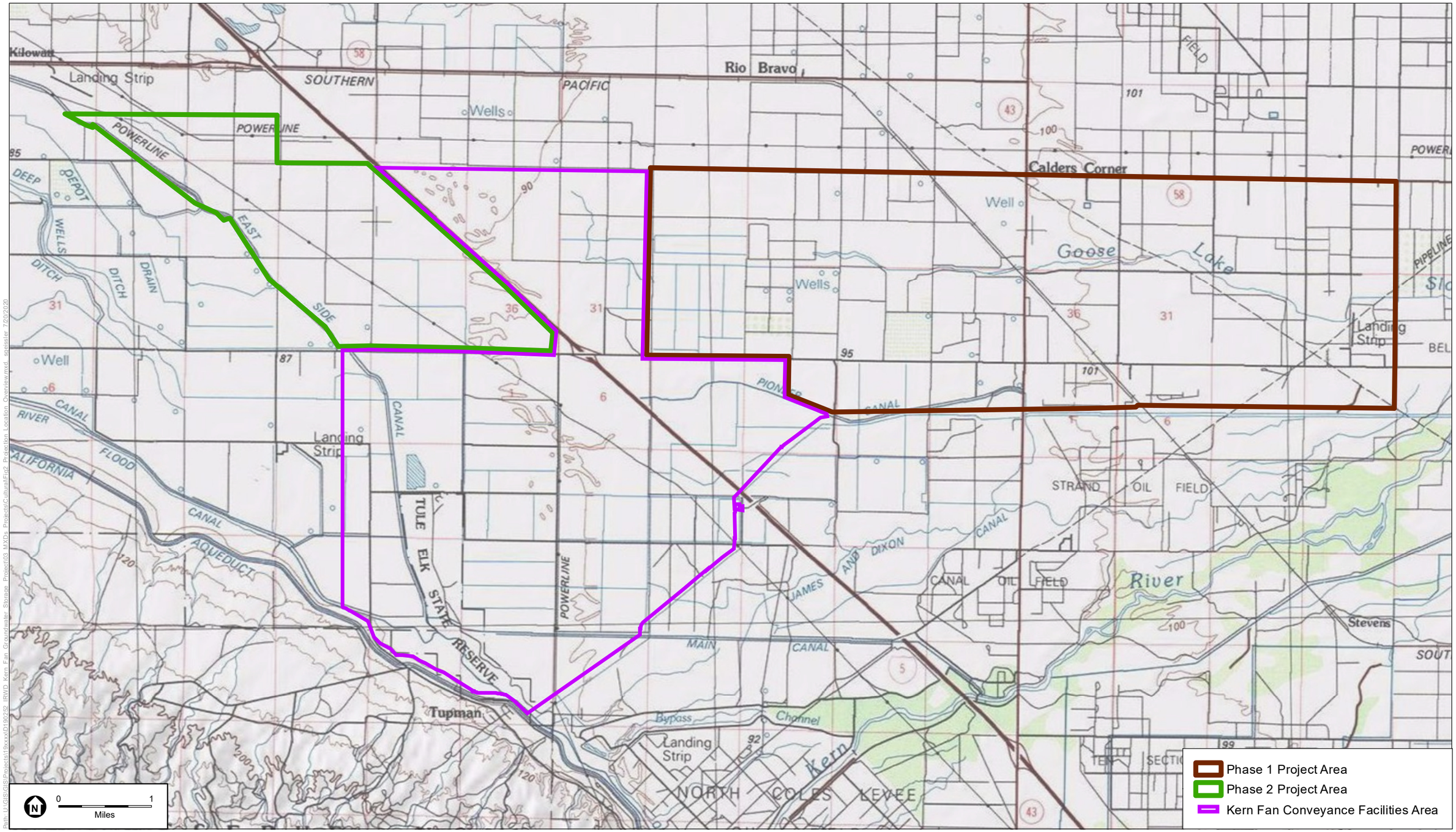


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



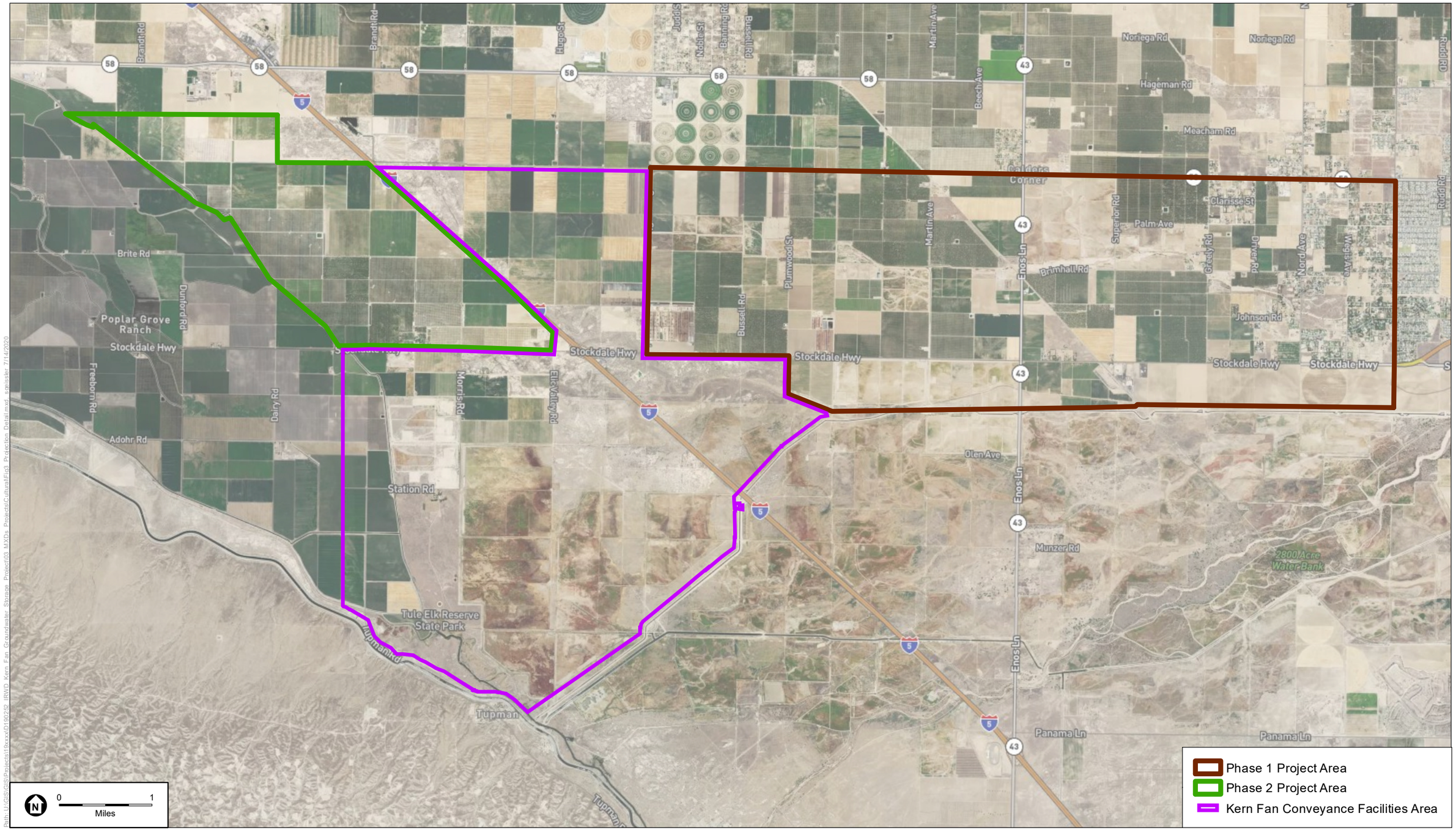
Path: U:\GIS\GIS\Projects\19xxxx\D190252 IRWD Kern Fan Groundwater Storage Project\03 MXDs Projects\Cultural\Fig2 Projection Location Overview.mxd, saeissler 7/20/2020

SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Robert Robinson, Chairperson
Kern Valley Indian Community
P.O. Box 1010
Lake Isabella, CA 93240

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Robinson:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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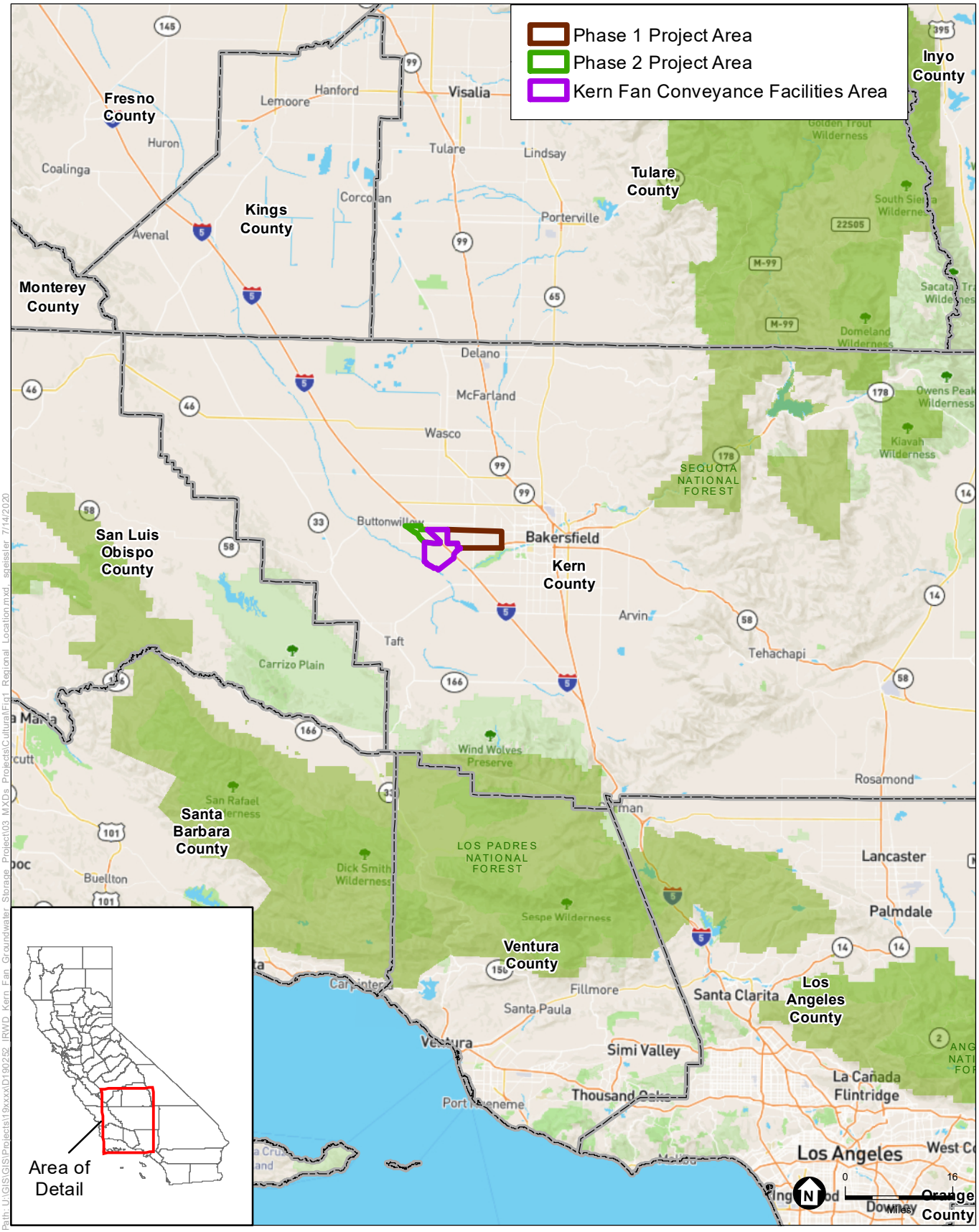
Figure 3 – Project Detail

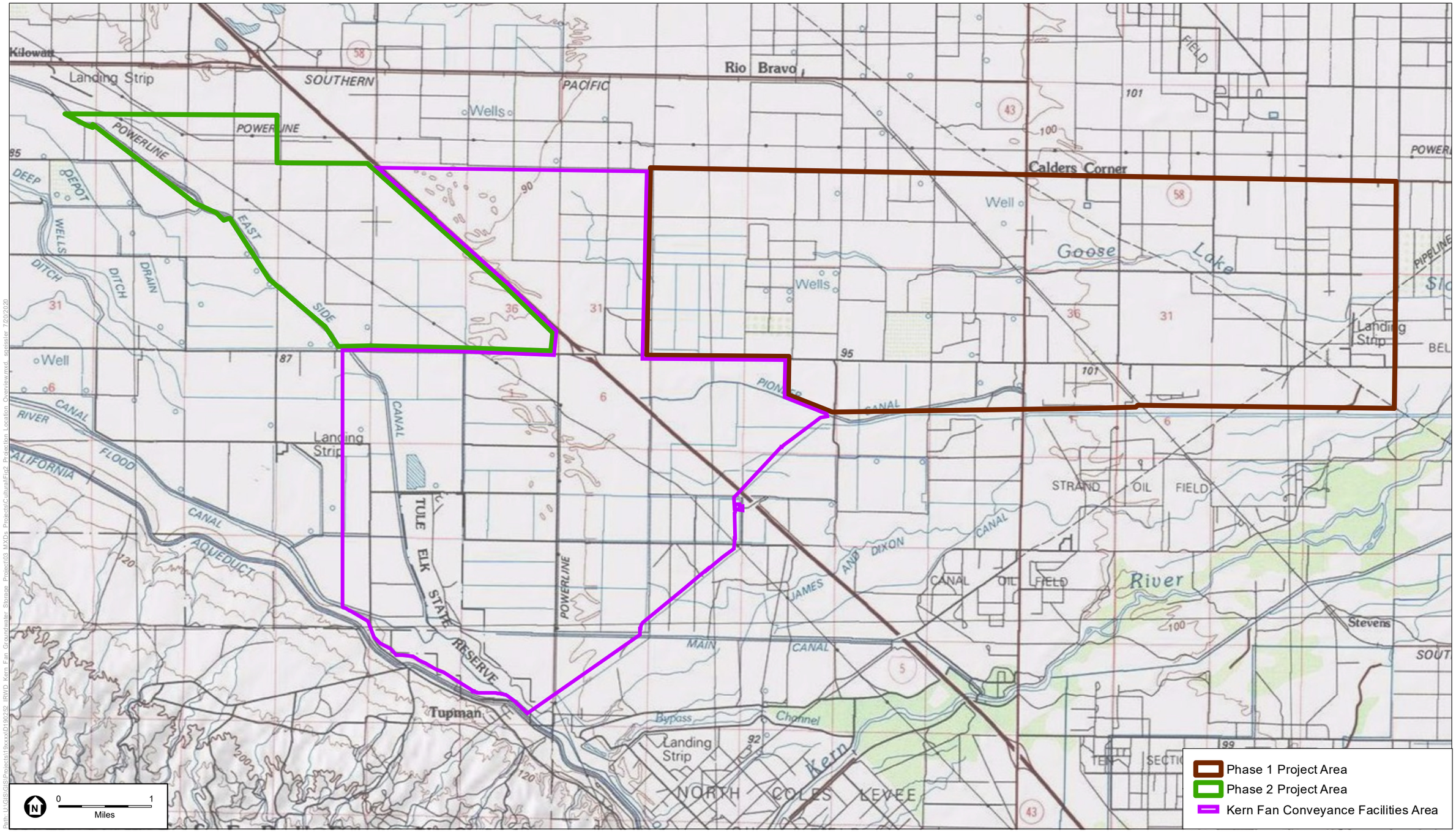


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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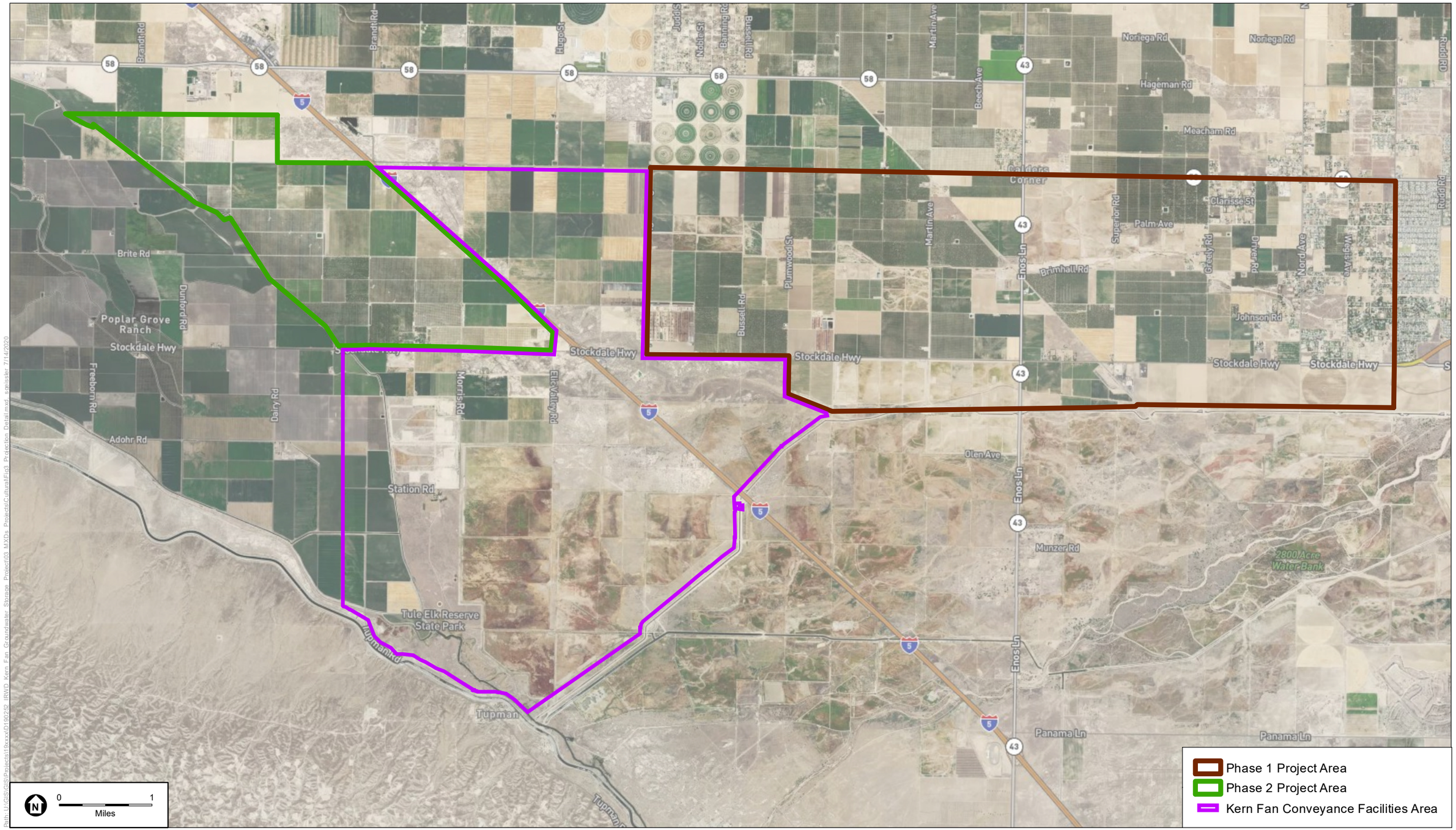
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Leo Sisco, Chairpeson
Santa Rosa Rancheria Tachi Yokut Tribe
P.O. Box 8
Lemoore, CA 93245

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Sisco:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

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A search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was conducted on May 6, 2020. The results were negative, indicating that the NAHC does not have any sacred sites or Native American cultural resources on file within the proposed project areas (Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area).

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If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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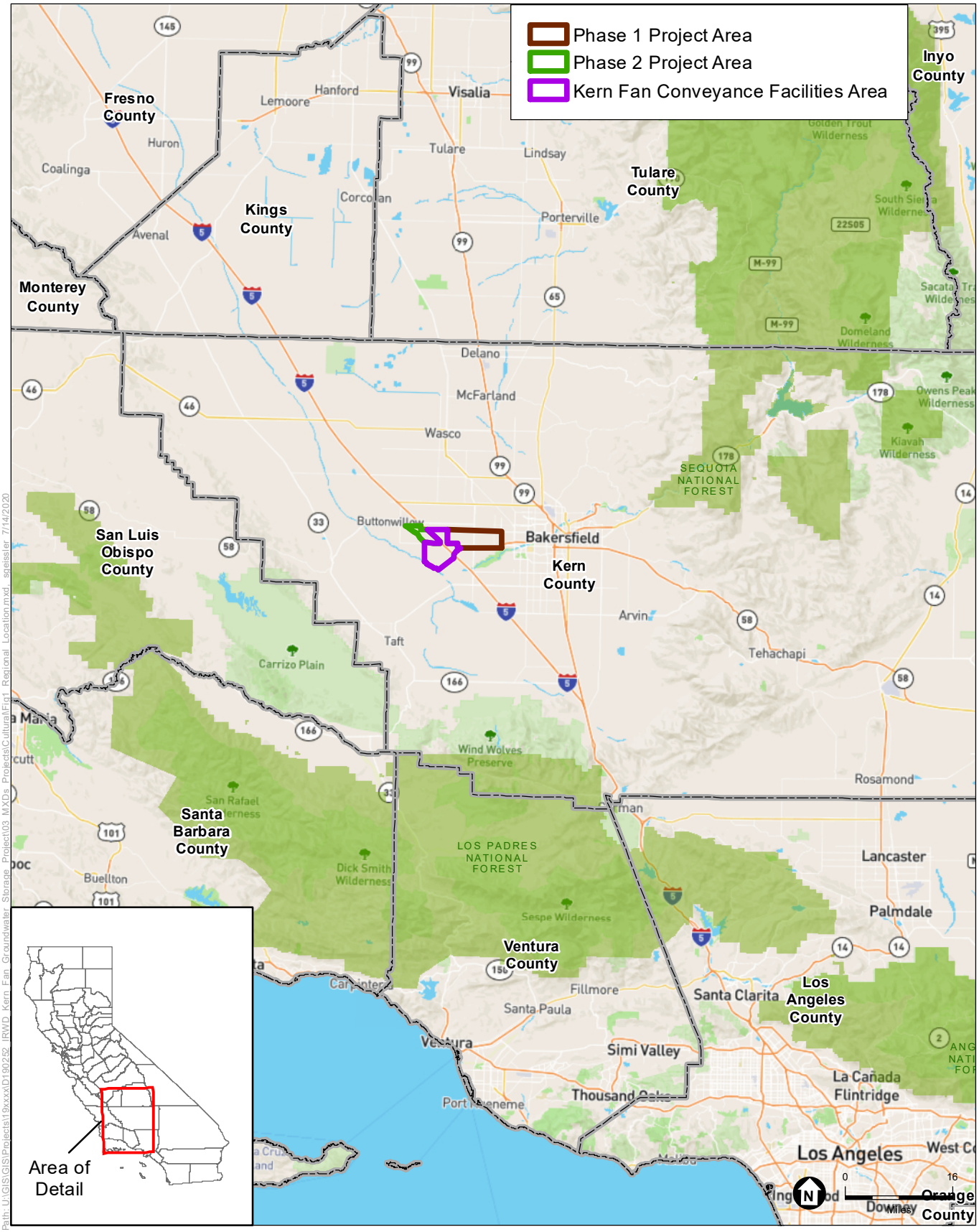
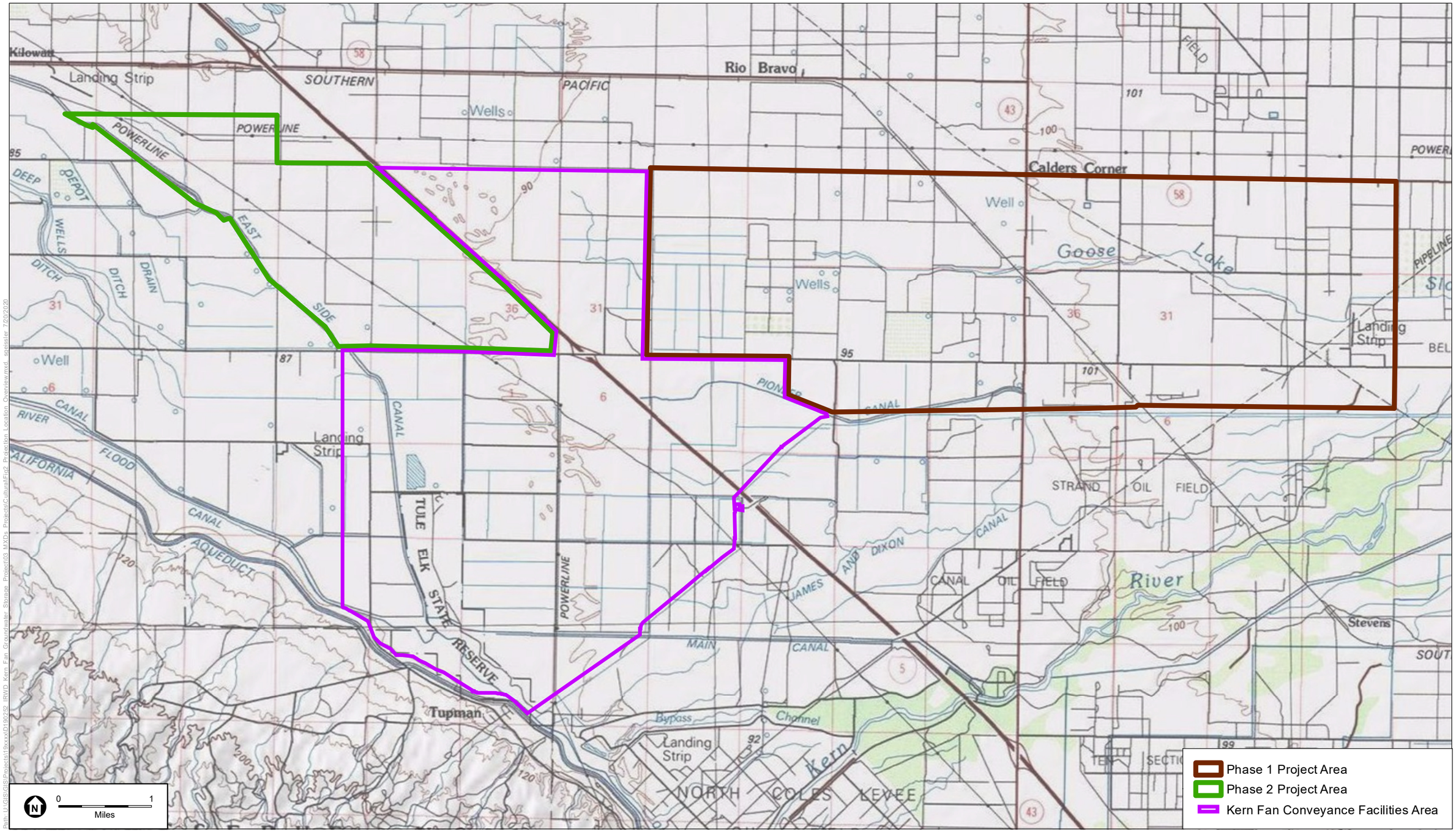


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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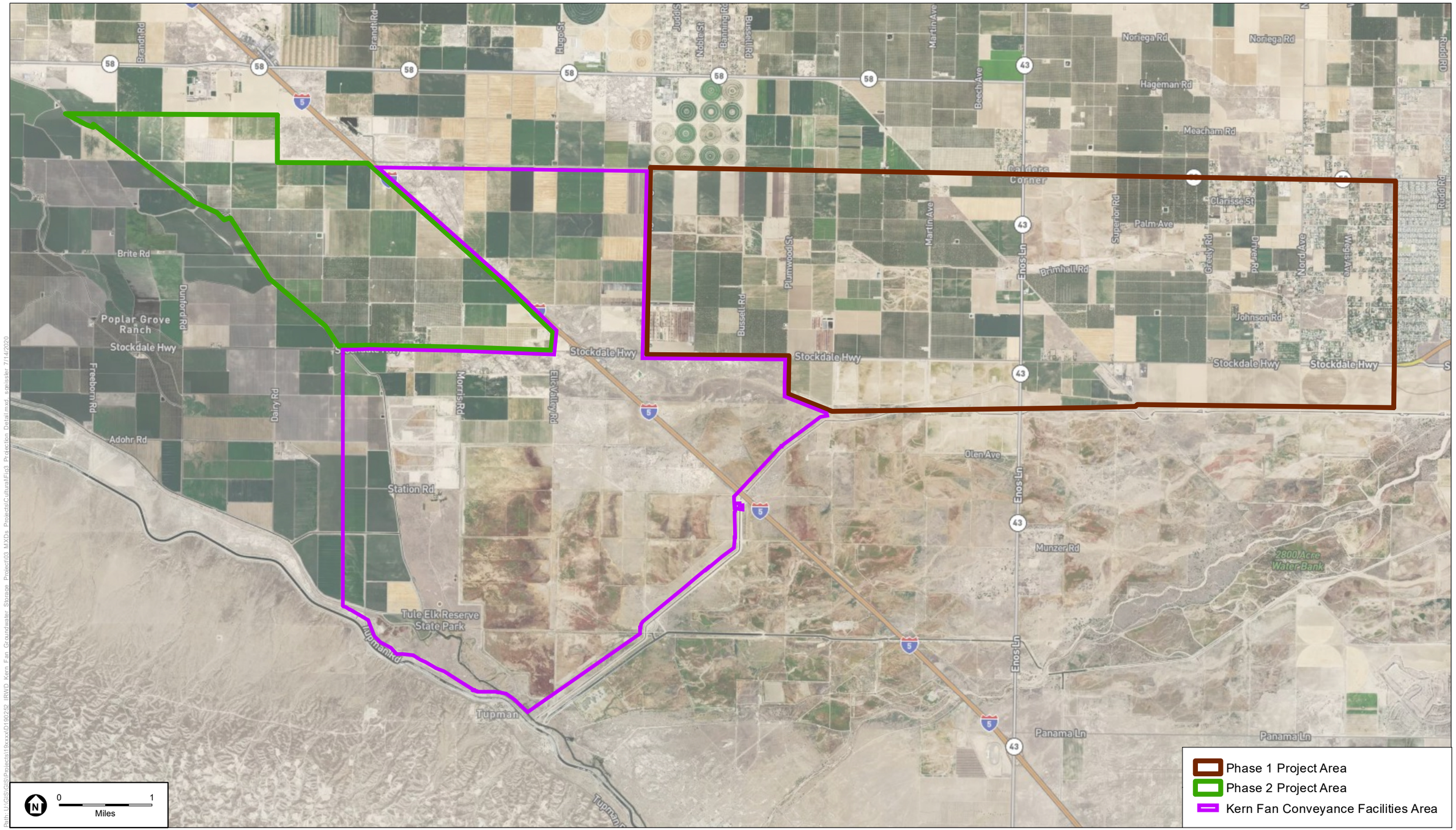
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Mona Olivas Tucker, Chairwoman
Yak tityu tityu yak tilhini – Northern Chumash Tribe
660 Camino del Rey
Arroyo Grande, CA 93420

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairwoman Olivas Tucker:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Cultural Resources Program Manager

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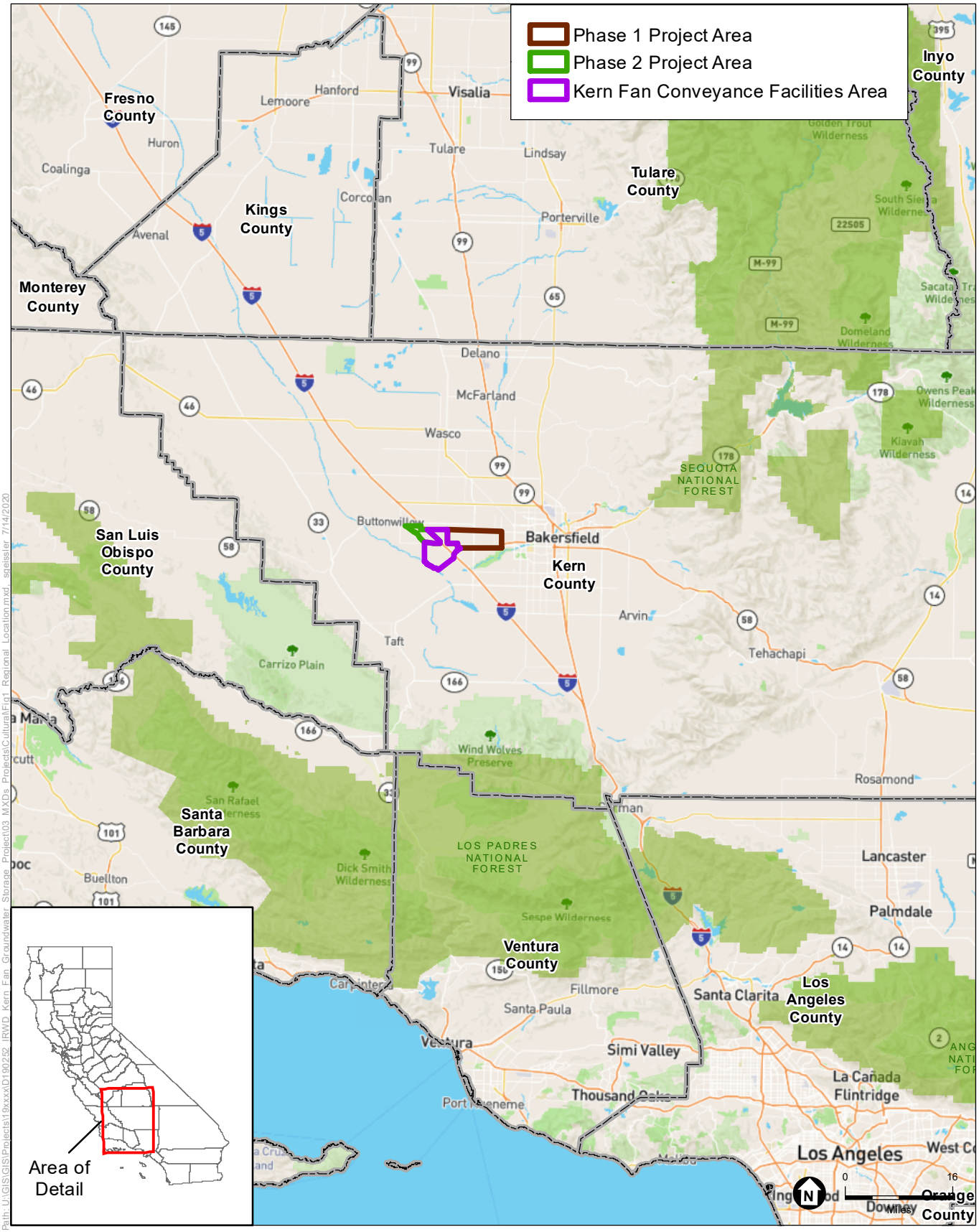
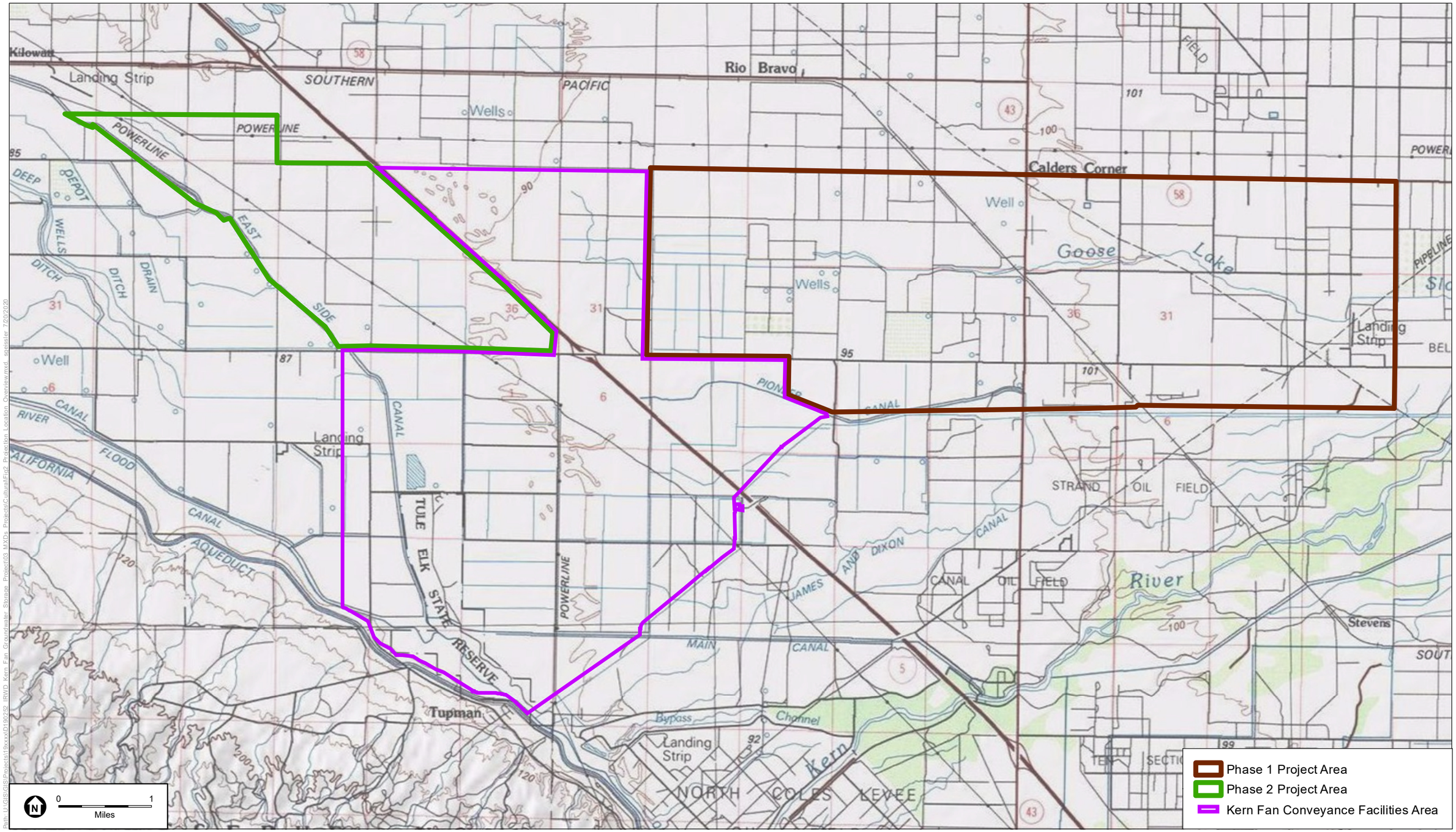


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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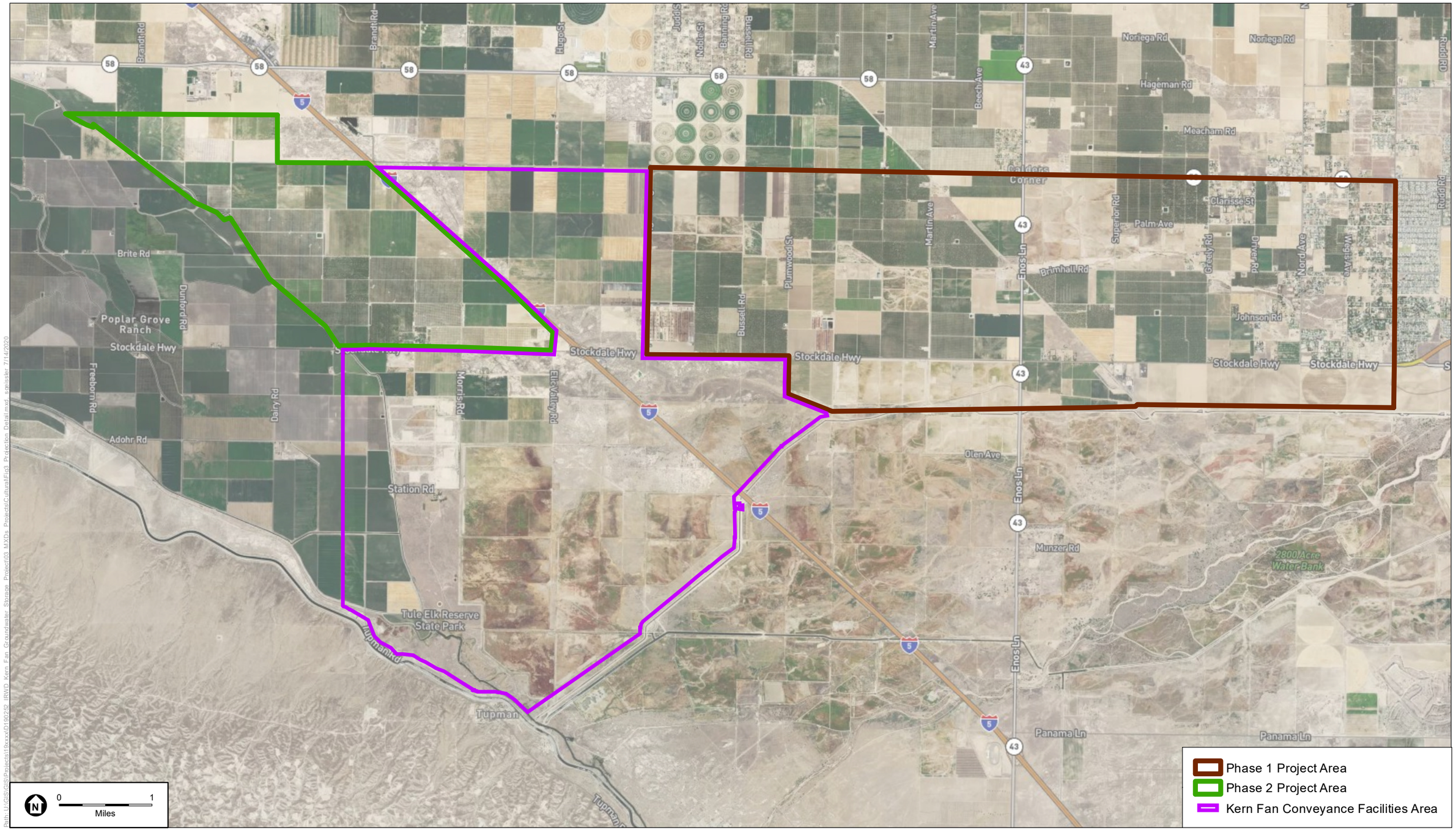
Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Julie Turner, Secretary
Kern Valley Indian Community
P.O. Box 1010
Lake Isabella, CA 93240

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Turner:

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Cultural Resources Program Manager

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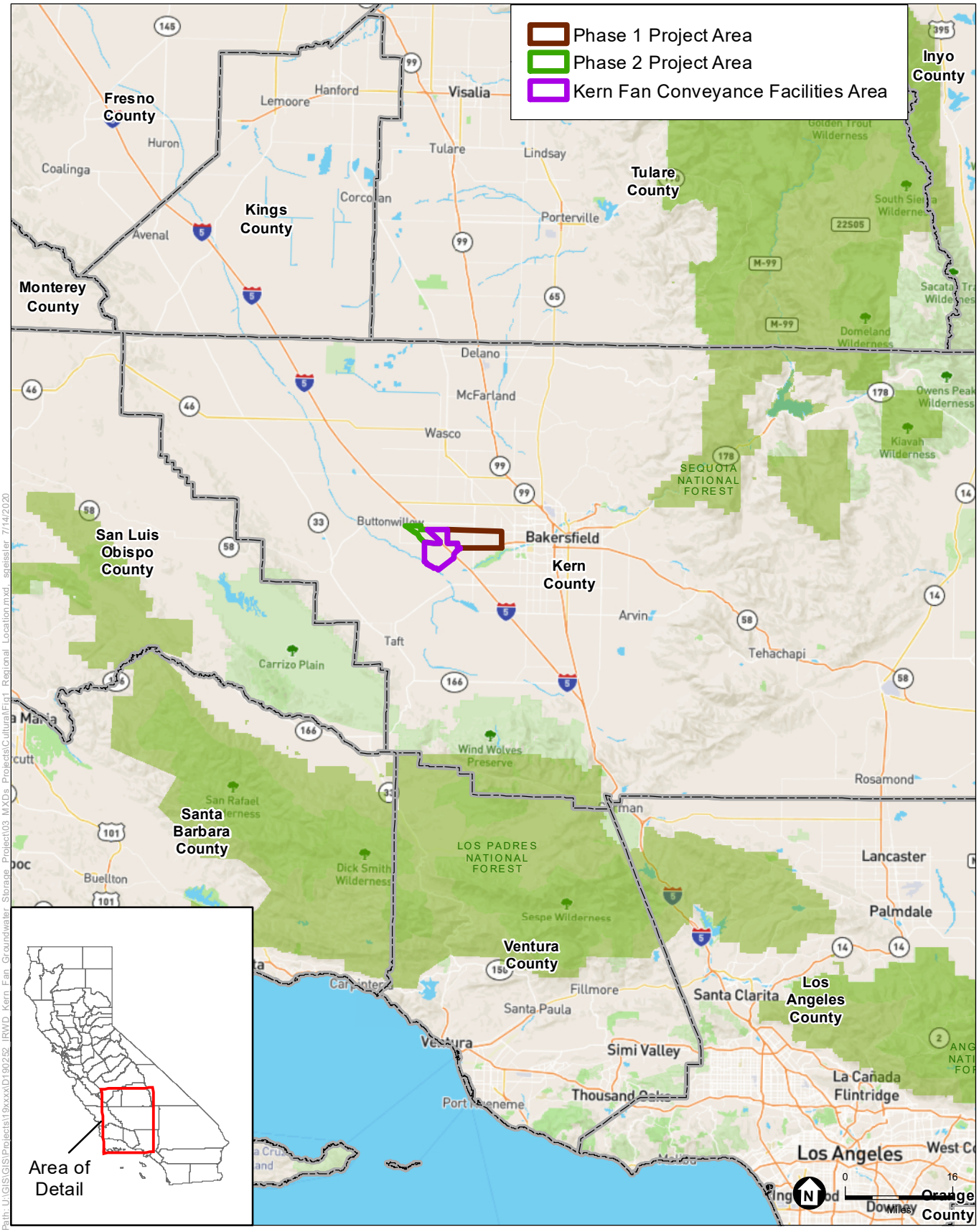
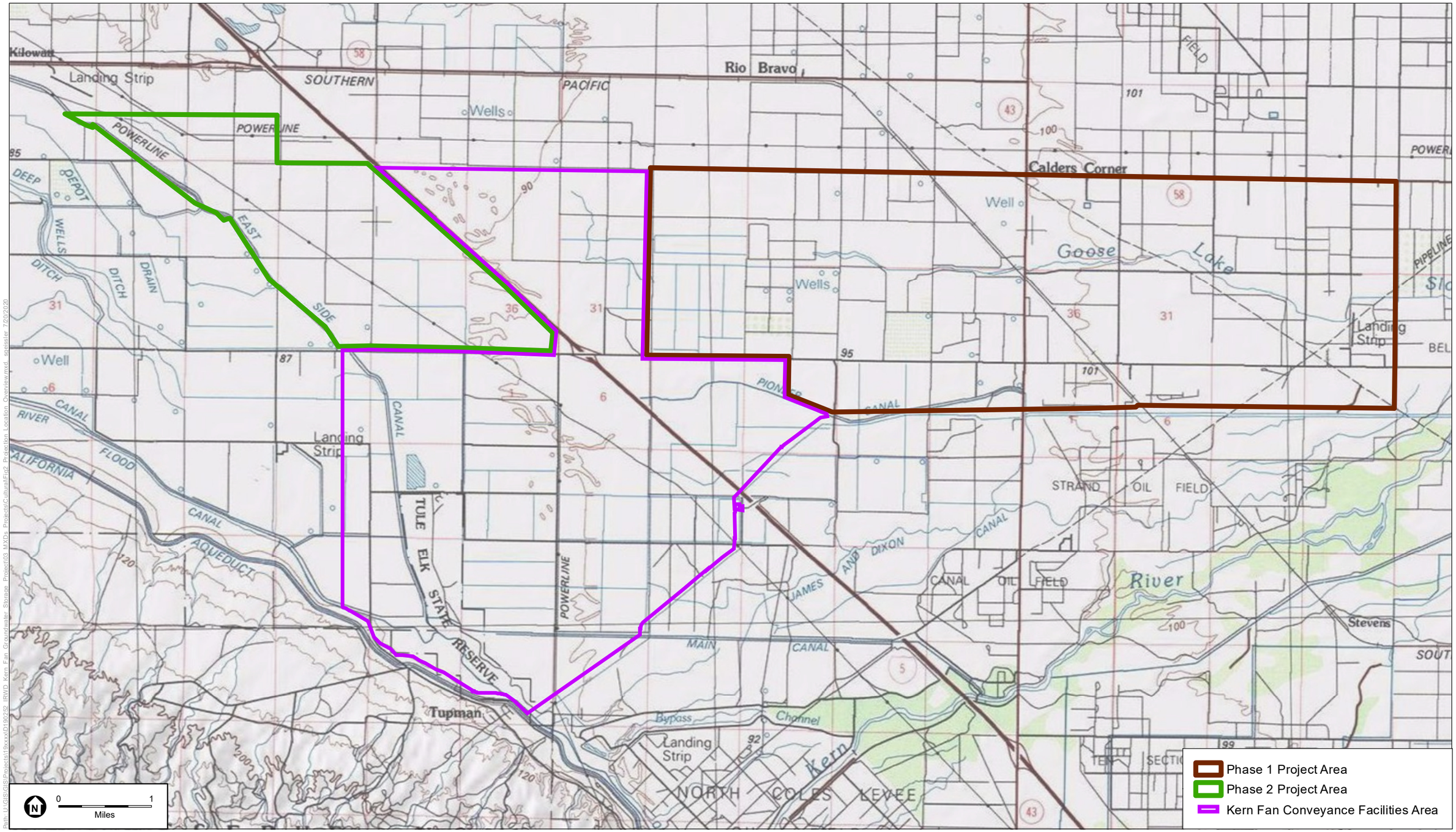


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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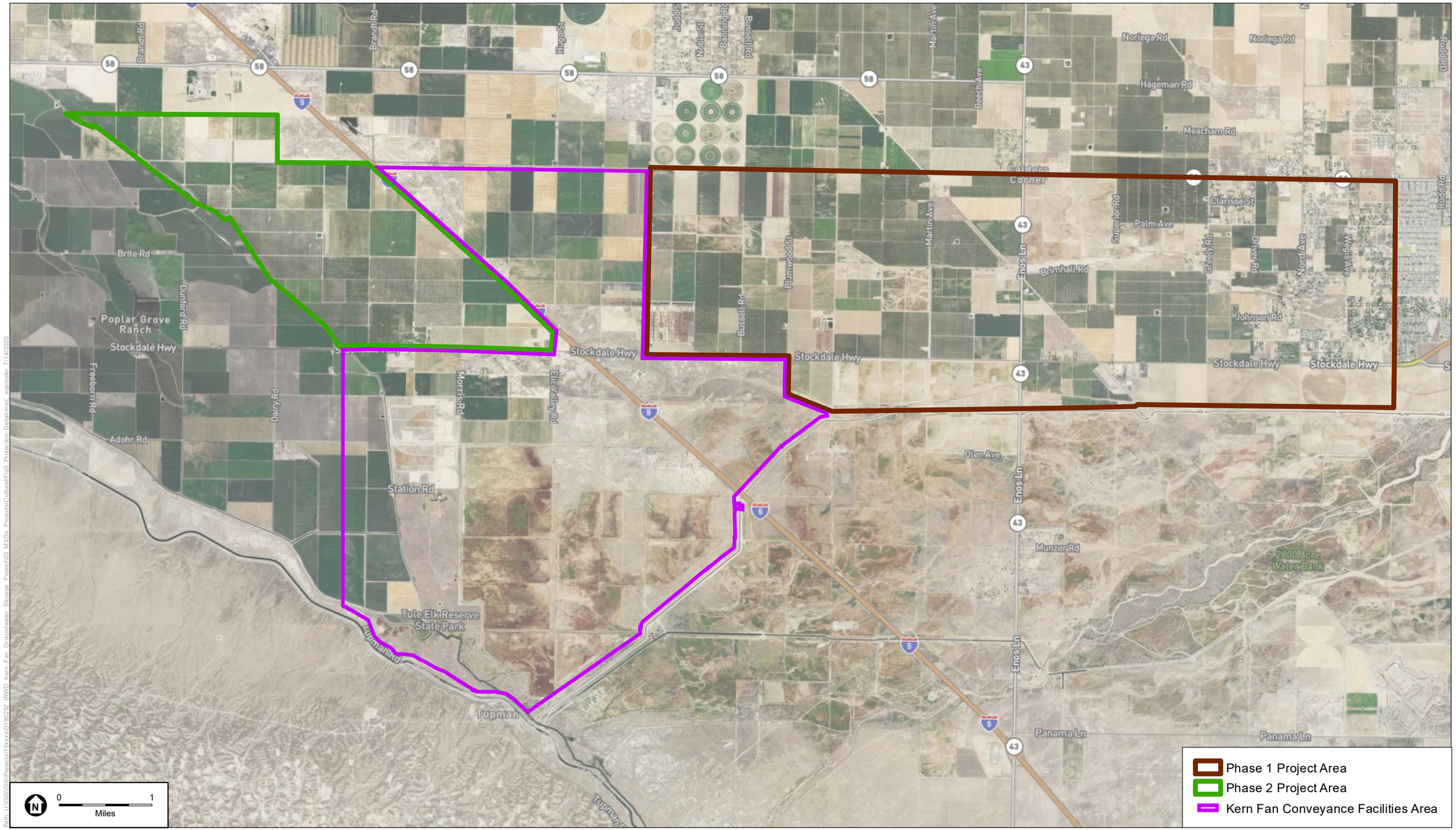
Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Kenneth Woodrow, Chairperson
Wuksache Indian Tribe/Eshom Valley Band
1179 Rock Haven Ct.
Salinas, CA 93906

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Woodrow:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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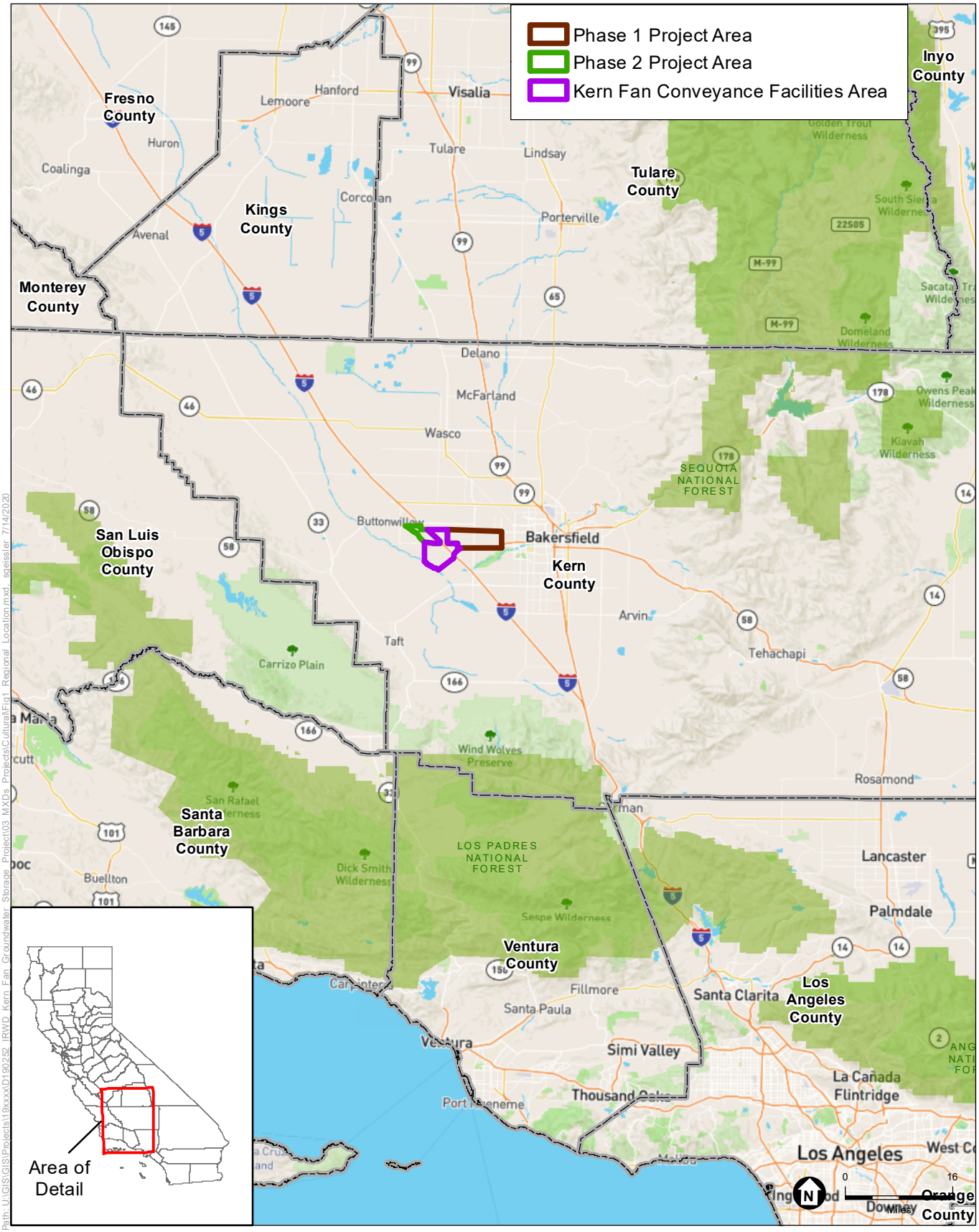
Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

Enclosures: Figure 1 – Regional Location
Figure 2 – Project Location
Figure 3 – Project Detail

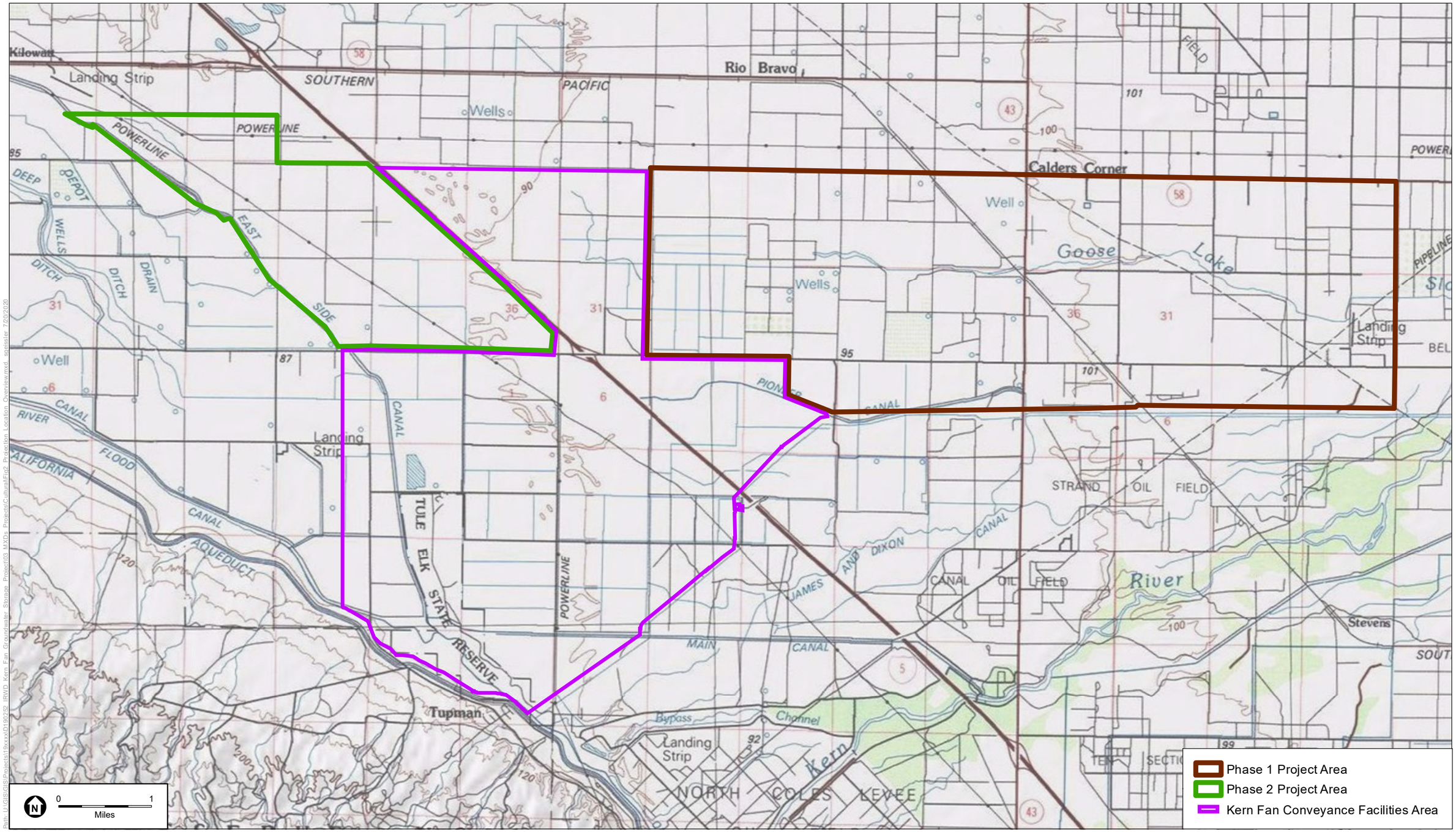


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



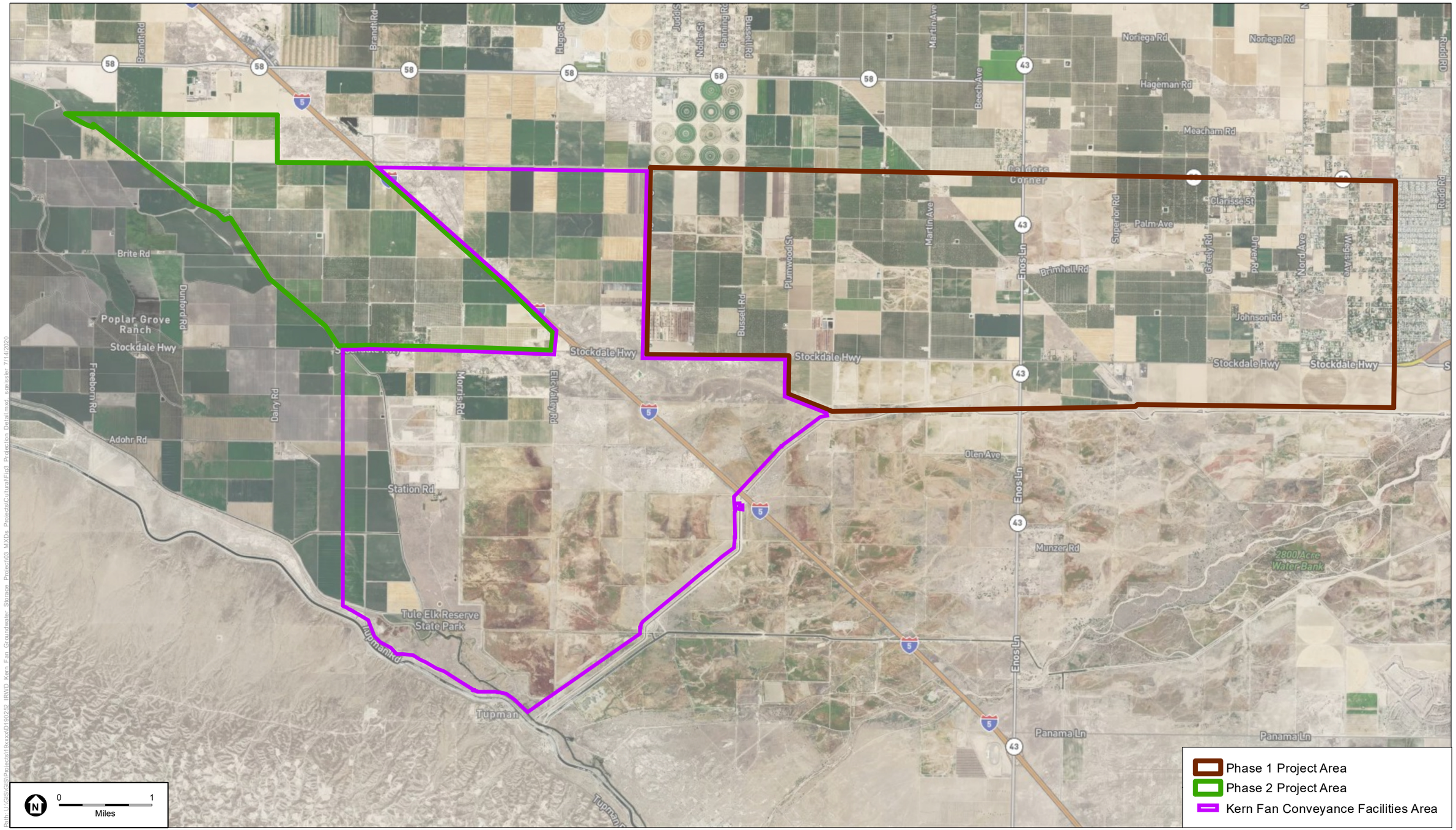
Path: U:\GIS\GIS\Projects\19xxxx\D190252 IRWD Kern Fan Groundwater Storage Project\03 MXDs Projects\Cultural\Fig2 Projection Location Overview.mxd, saeissler 7/20/2020

SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Delia Dominguez, Chairperson
Kitanemuk & Yowlumne Tejon Indians
115 Radio Street
Bakersfield, CA 93305

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Dominguez:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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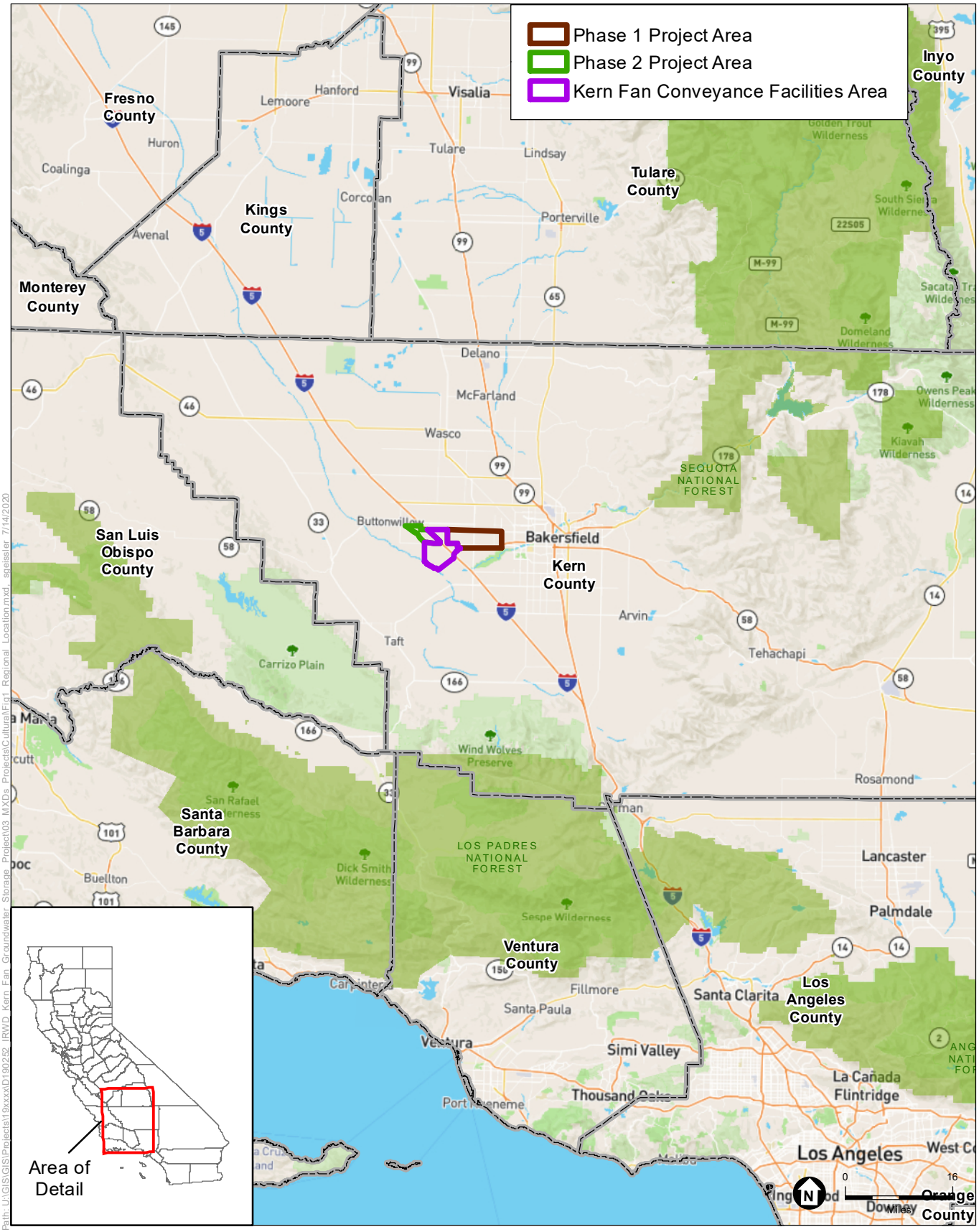
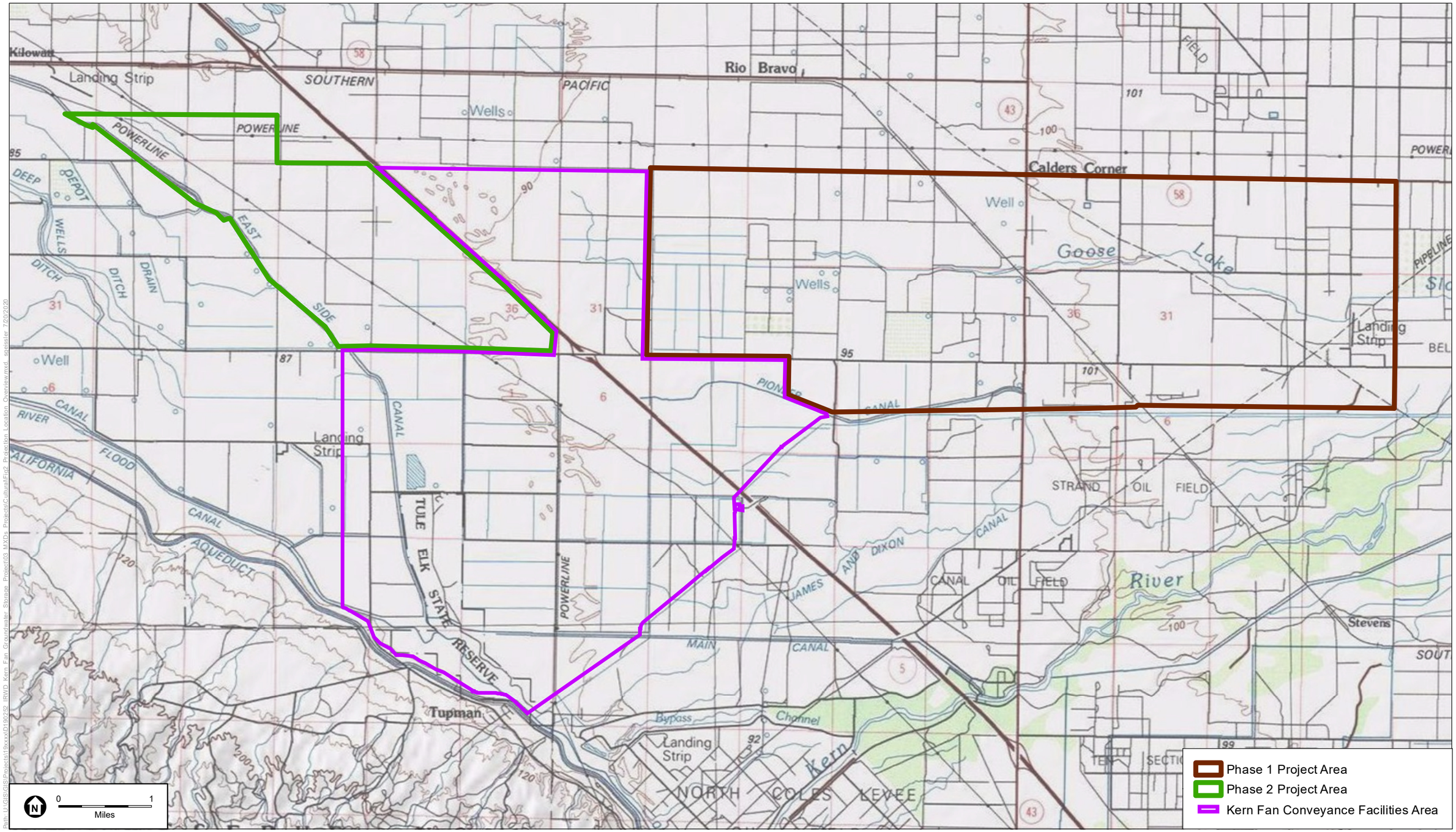


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



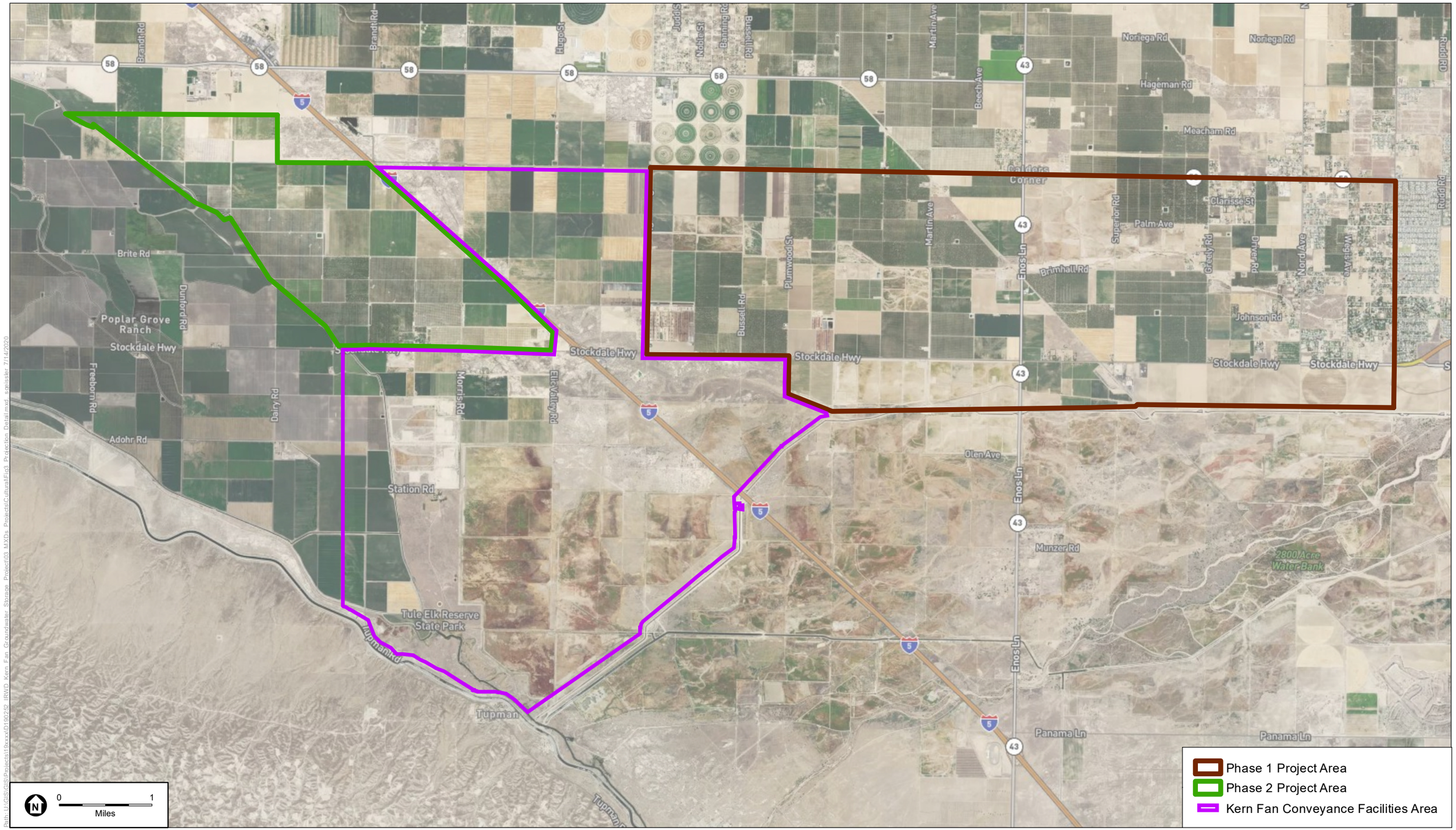
Path: U:\GIS\GIS\Projects\19xxxx\D190252 IRWD Kern Fan Groundwater Storage Project\03 MXDs Projects\Cultural\Fig2 Projection Location Overview.mxd, saeissler 7/20/2020

SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Octavio Escobedo III, Chairpeson
Tejon Indian Tribe
P.O. Box 640
Arvin, CA 93203

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Escobedo:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

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A search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was conducted on May 6, 2020. The results were negative, indicating that the NAHC does not have any sacred sites or Native American cultural resources on file within the proposed project areas (Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area).

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If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

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Cultural Resources Program Manager

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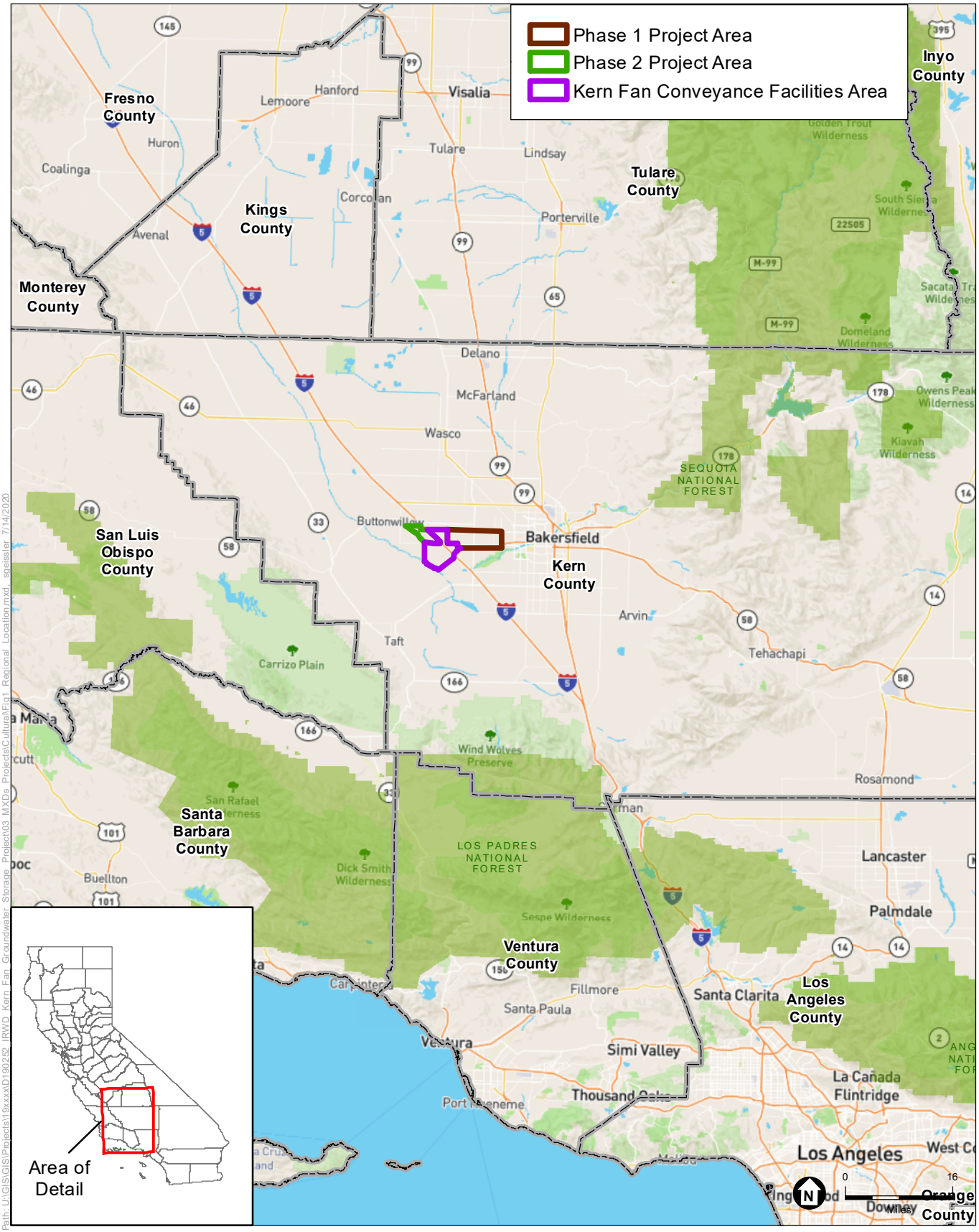
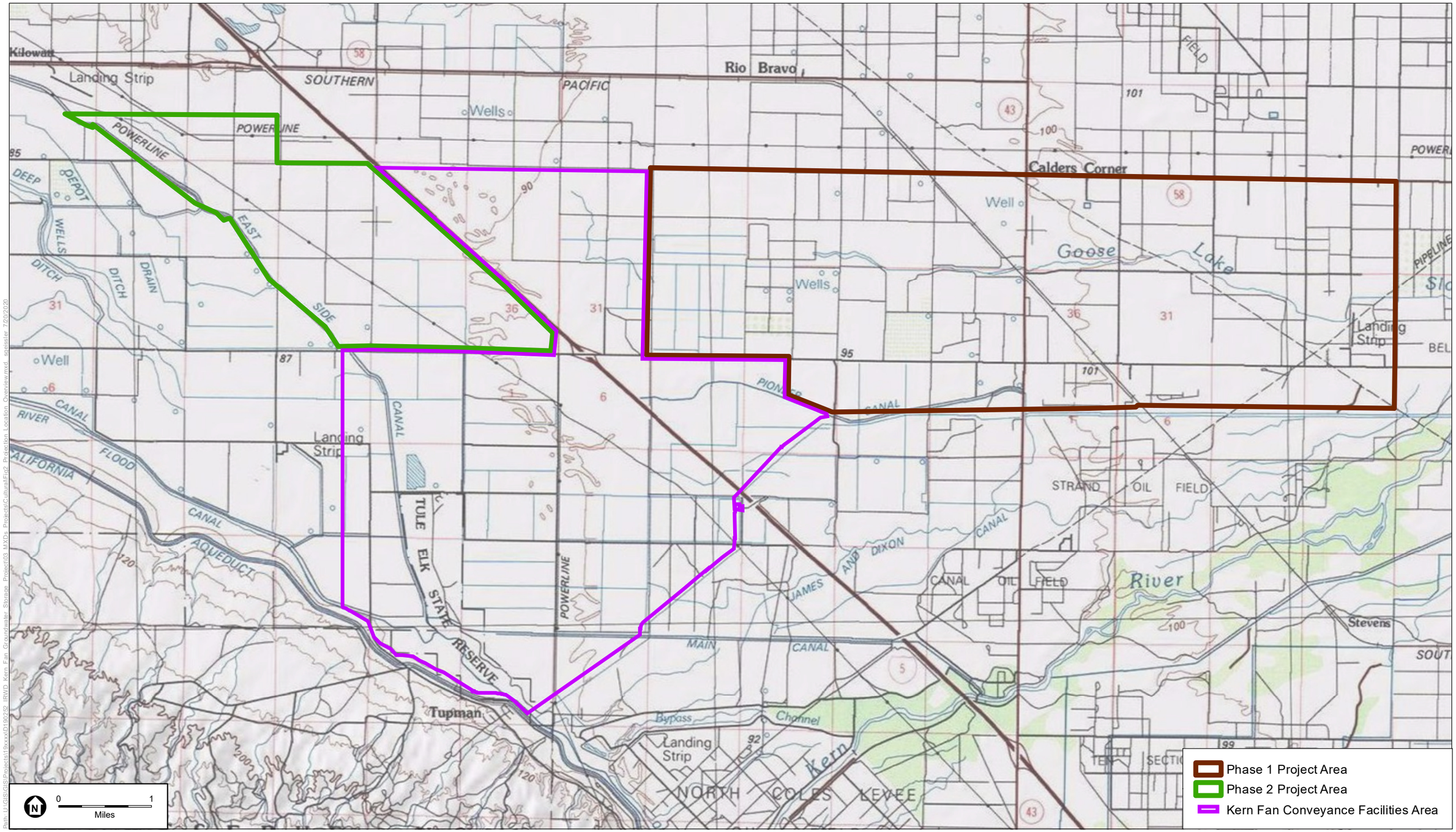


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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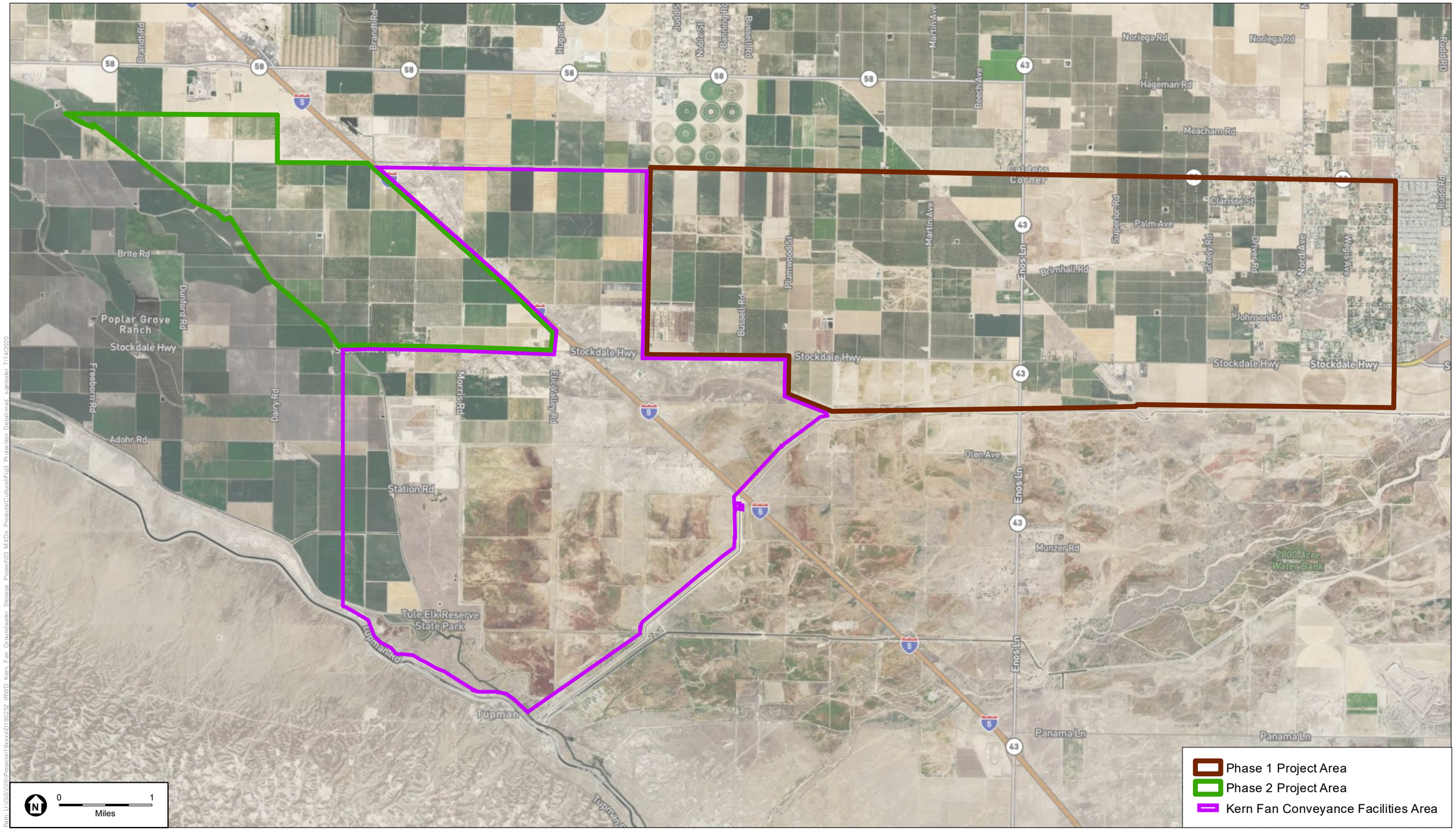
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Robert L. Gomez, Jr., Tribal Chairperson
Tubatulabals of Kern Valley
P.O. Box 226
Lake Isabella, CA 93240

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Tribal Chairperson Gomez:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Cultural Resources Program Manager

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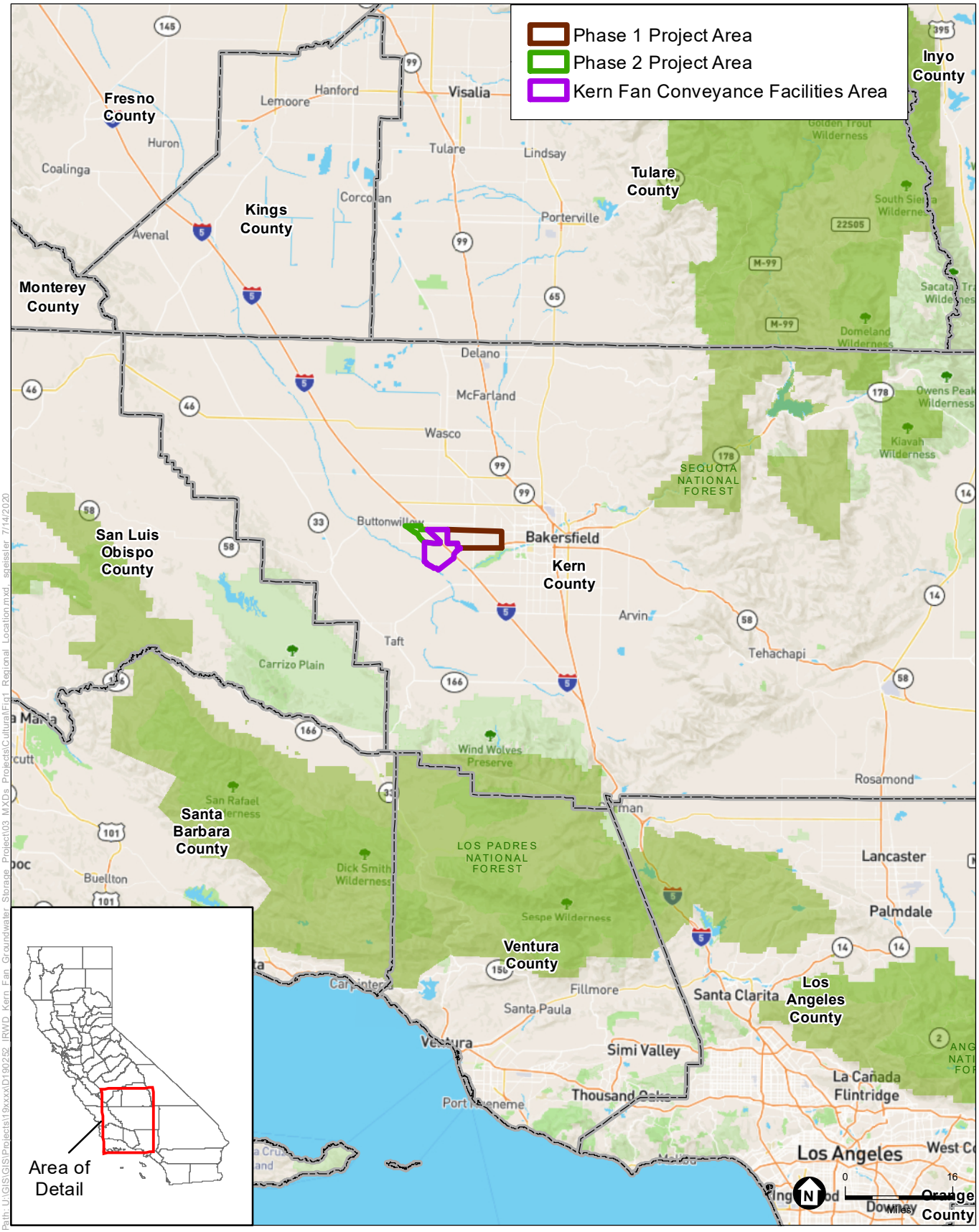
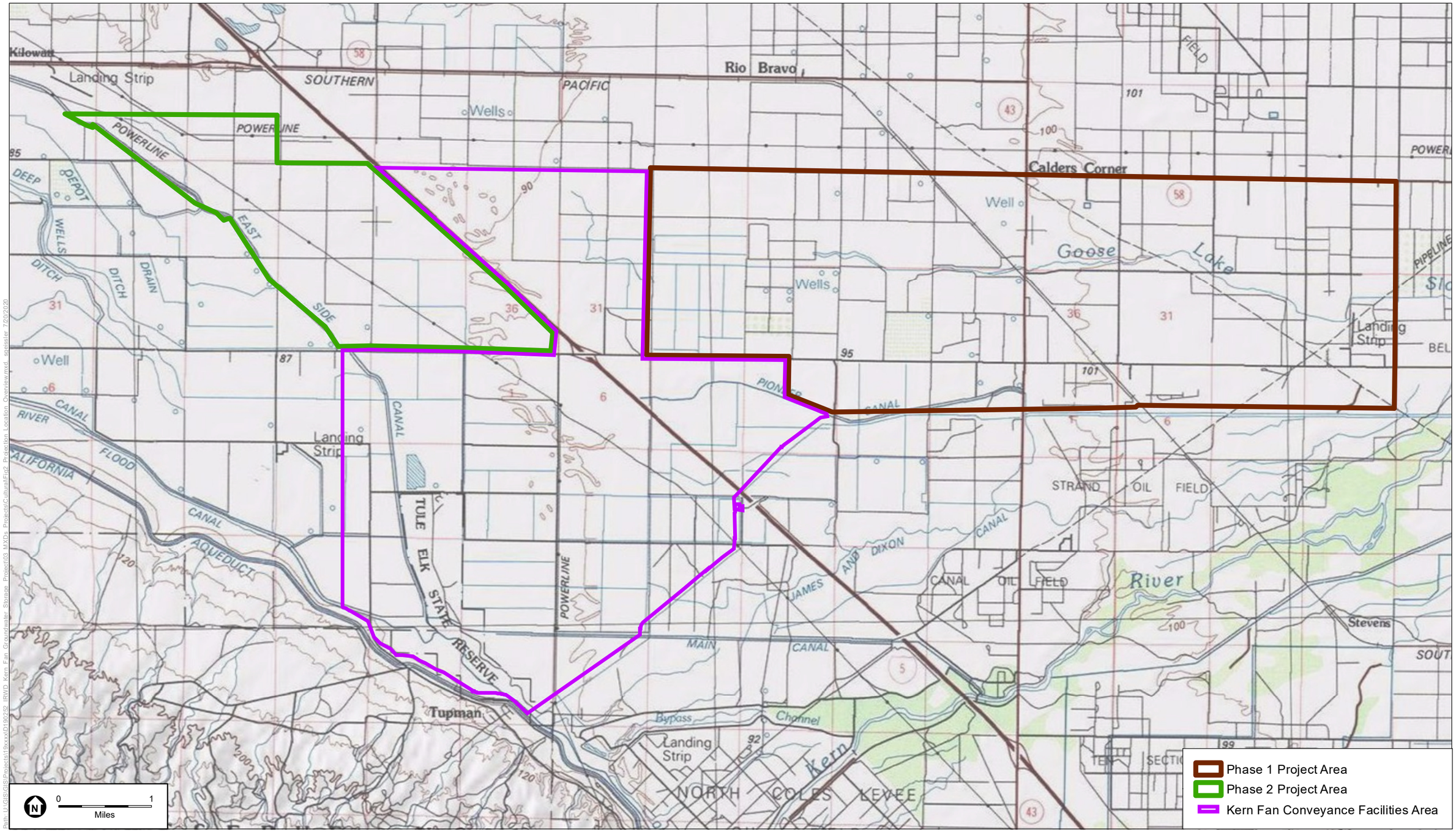


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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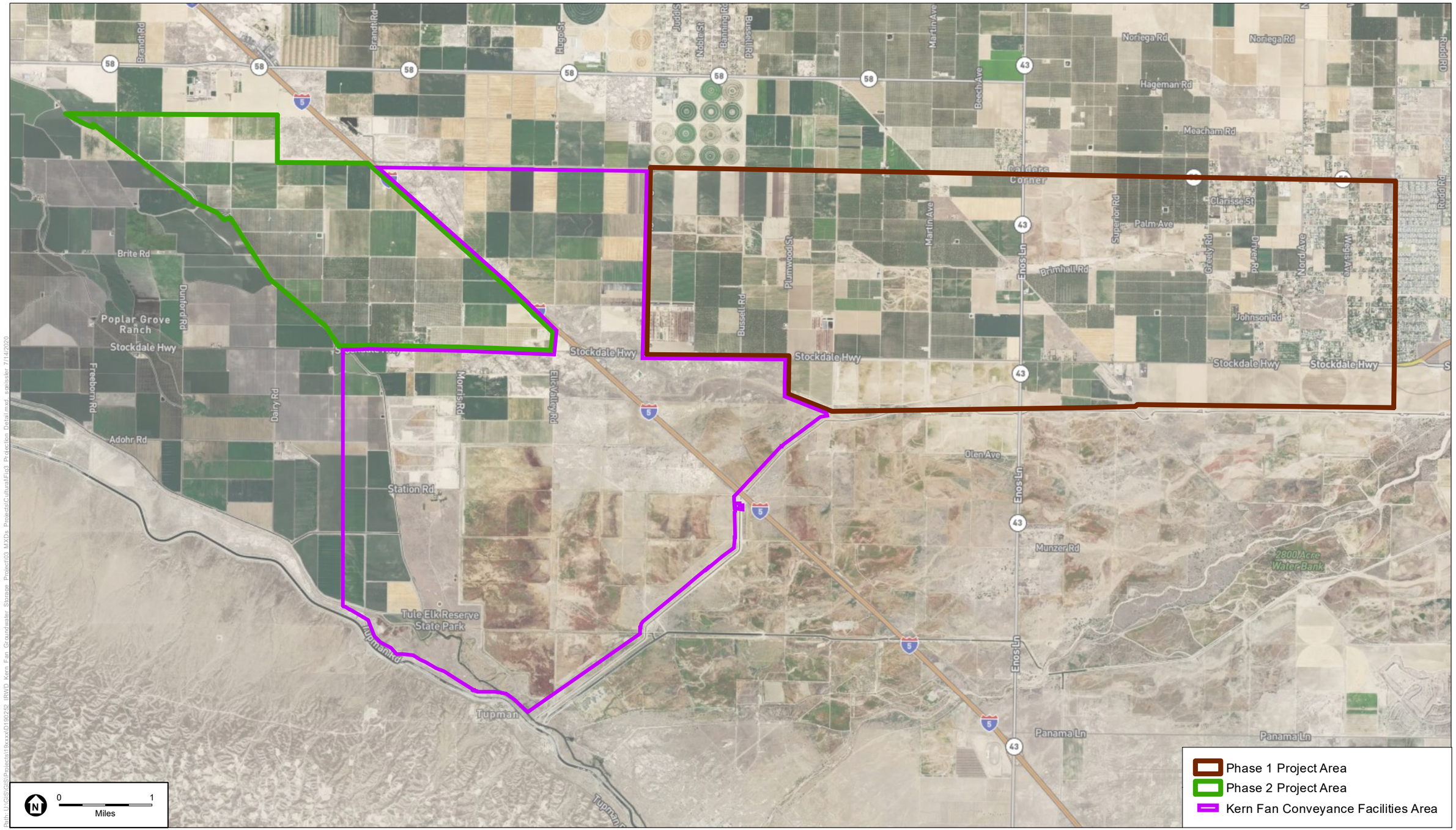
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Danelle Gutierrez, Tribal Historic Preservation Officer
Big Pine Paiute Tribe of the Owens Valley
P.O. Box 700
Big Pine, CA 93513

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Gutierrez:

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Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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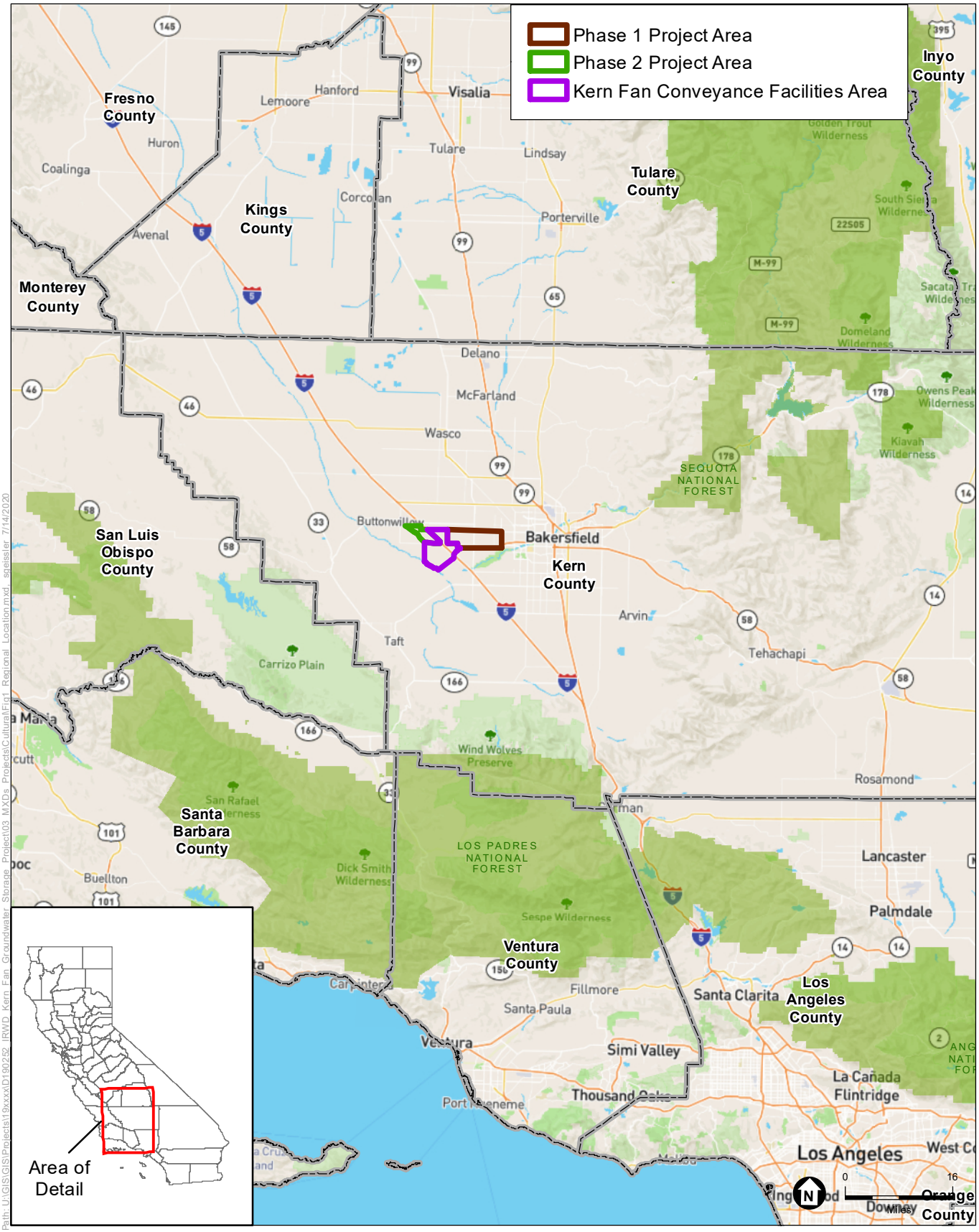

SOURCE: ESRI.

Kern Fan Groundwater Storage Project

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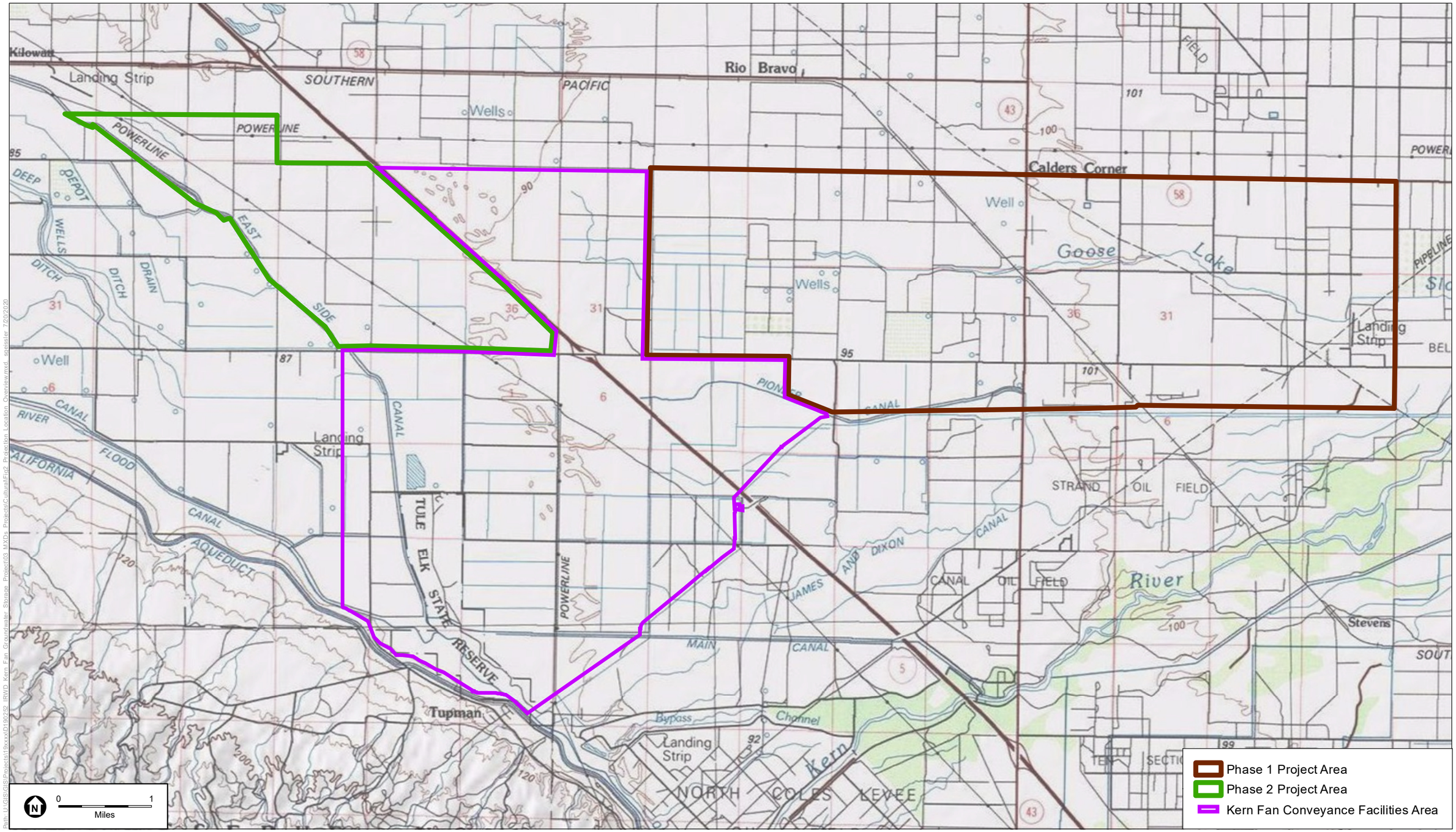
Regional Location

ESA



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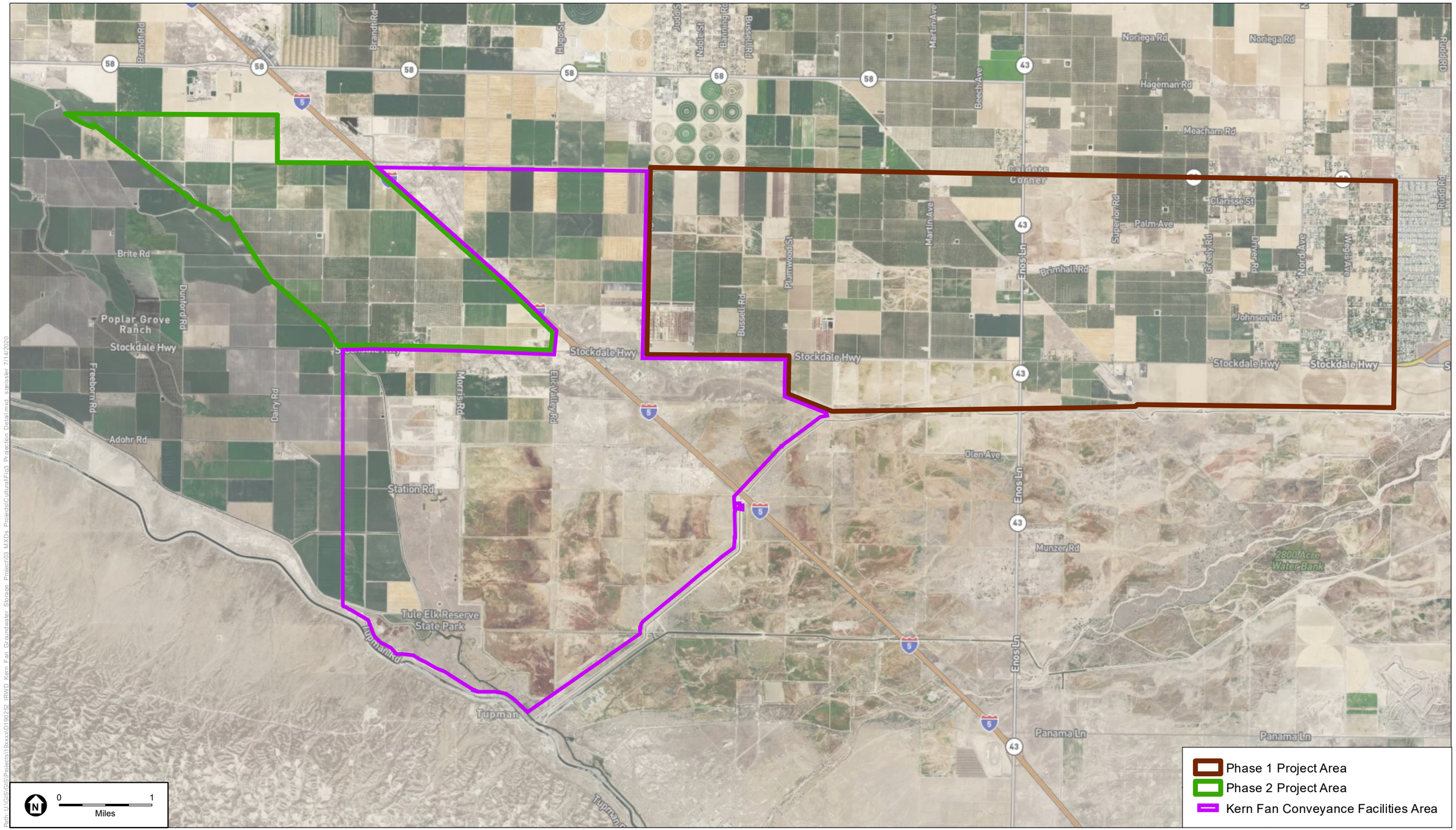
Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Brandy Kendricks
Kern Valley Indian Community
30741 Foxridge Court
Tehachapi, CA 93561

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Kendricks:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

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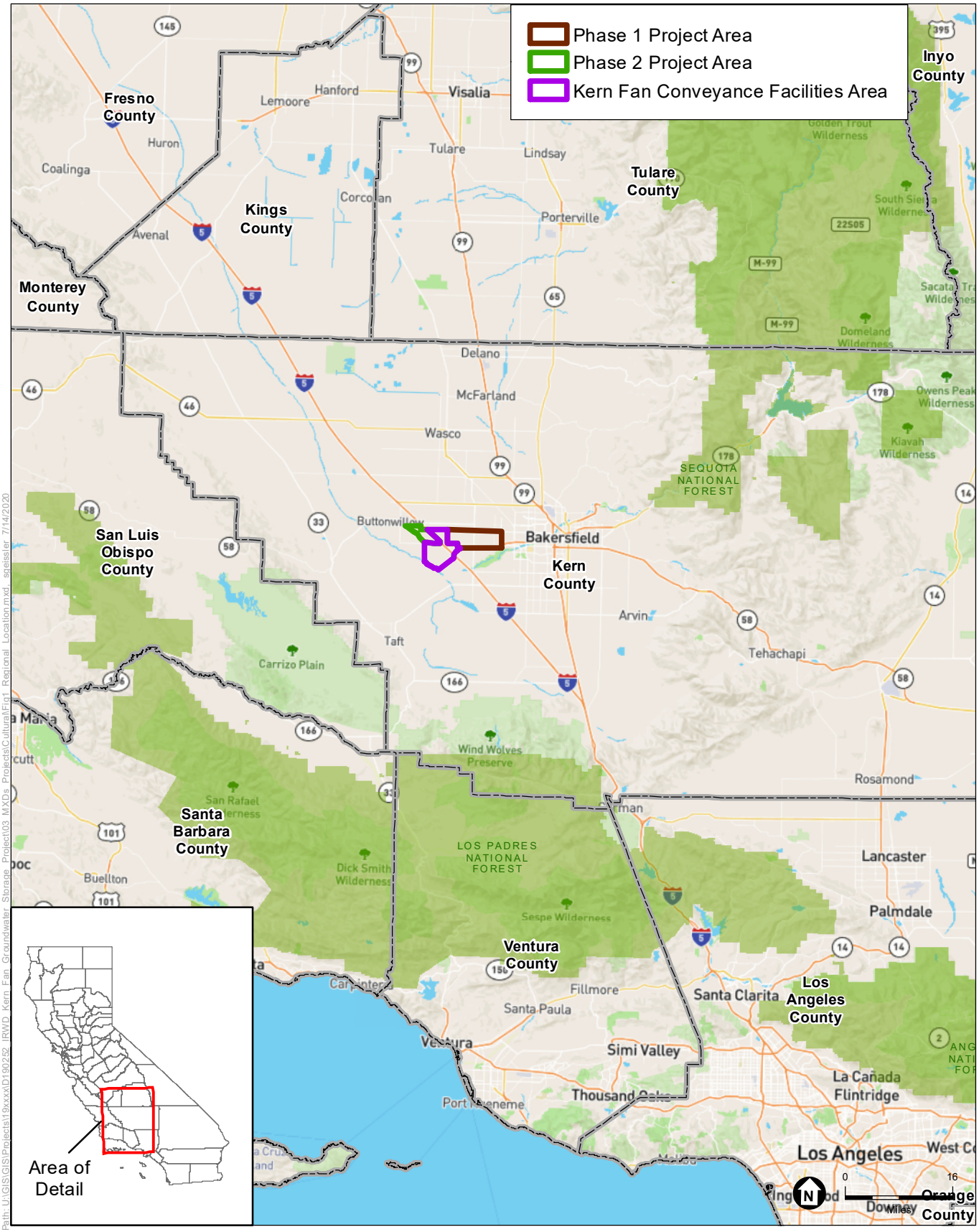
If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

Enclosures: Figure 1 – Regional Location
Figure 2 – Project Location
Figure 3 – Project Detail

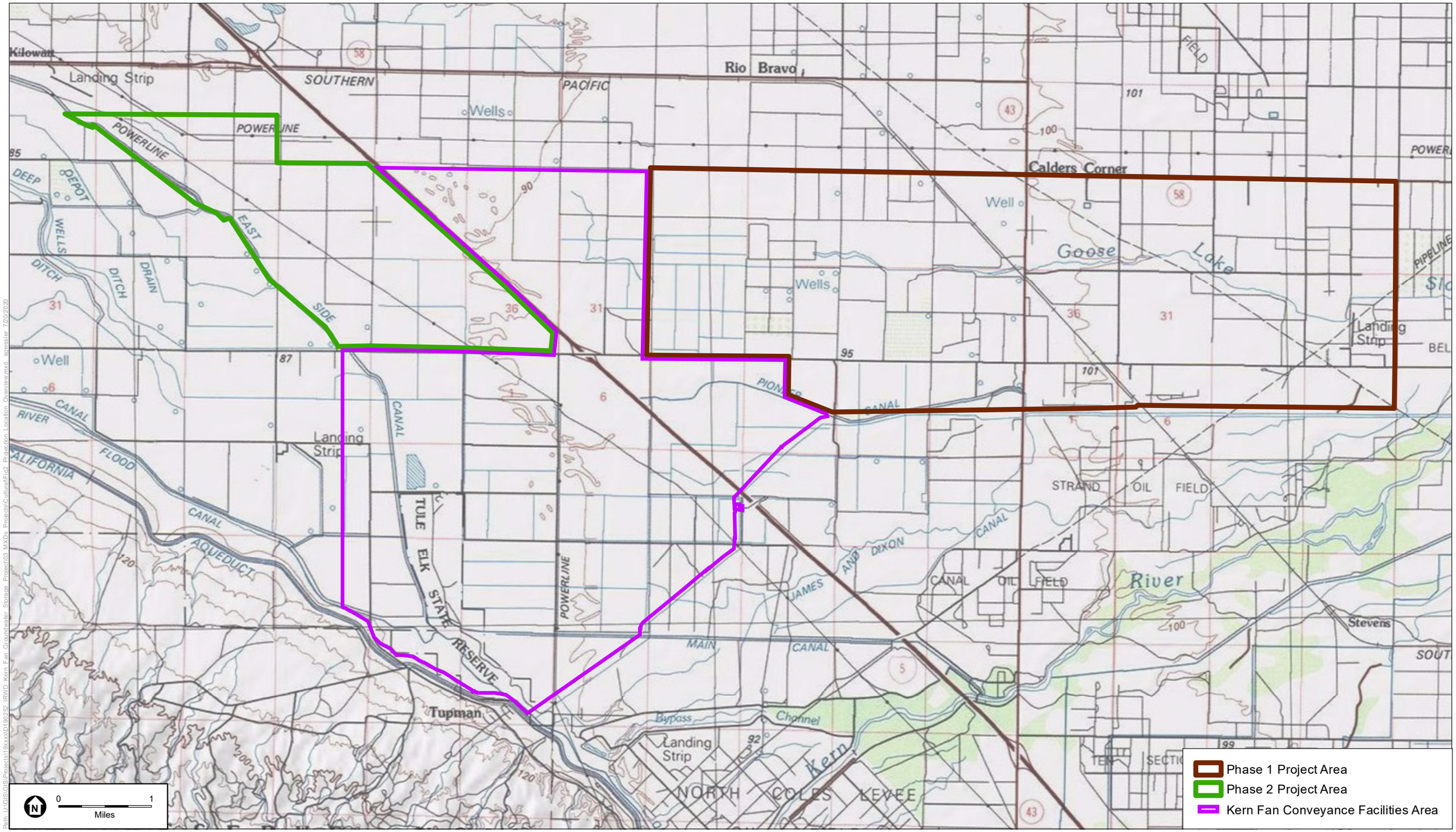


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



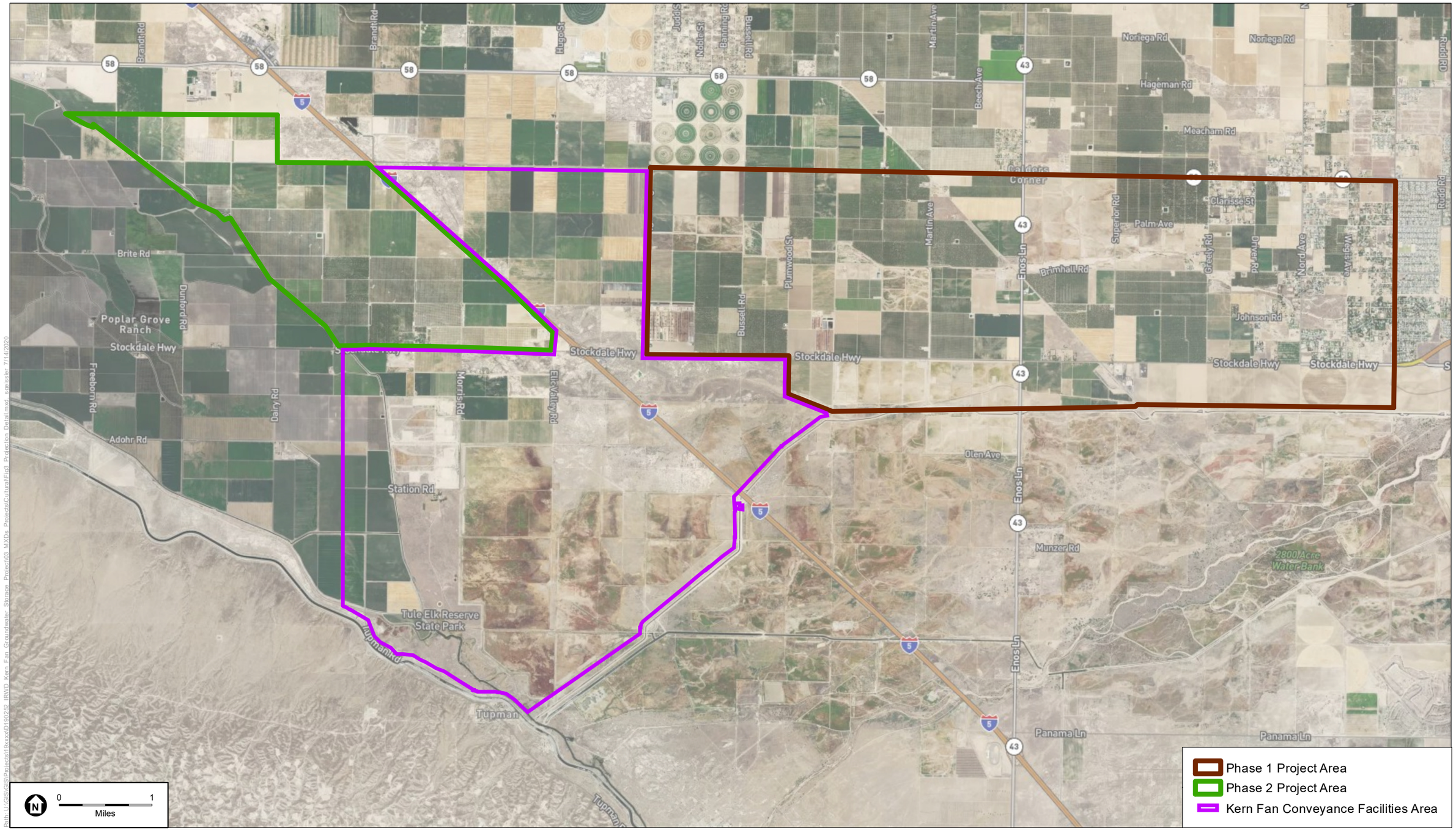
Path: U:\GIS\GIS\Projects\19xxxx\D190252 IRWD Kern Fan Groundwater Storage Project\03 MXDs Projects\Cultural\Fig2 Projection Location Overview.mxd, saeissler 7/20/2020

SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Sally Manning, Environmental Director
Big Pine Paiute Tribe of the Owens Valley
P.O. Box 700
Big Pine, CA 93513

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Manning:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

A search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was conducted on May 6, 2020. The results were negative, indicating that the NAHC does not have any sacred sites or Native American cultural resources on file within the proposed project areas (Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area).

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If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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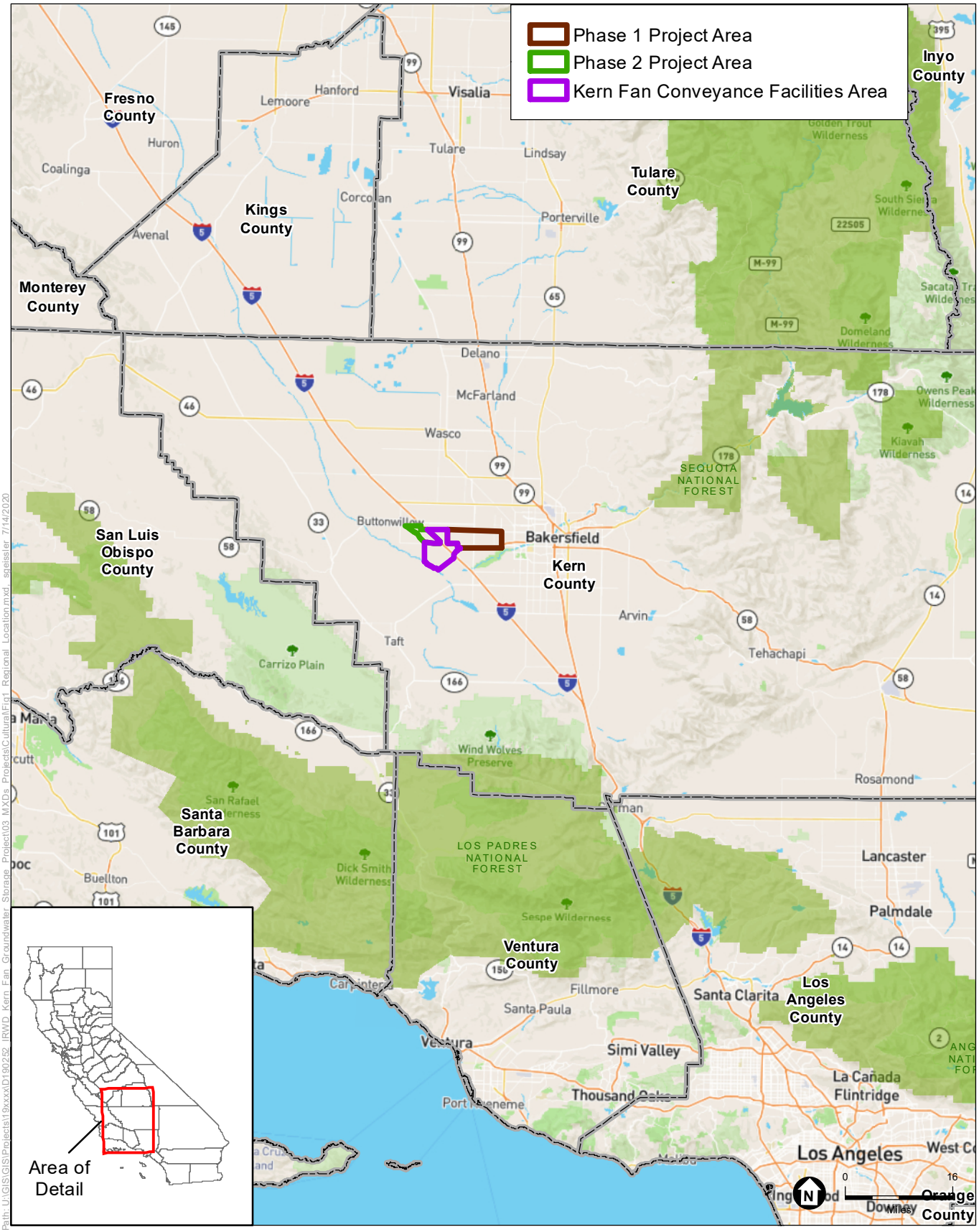
Figure 2 – Project Location
Figure 3 – Project Detail

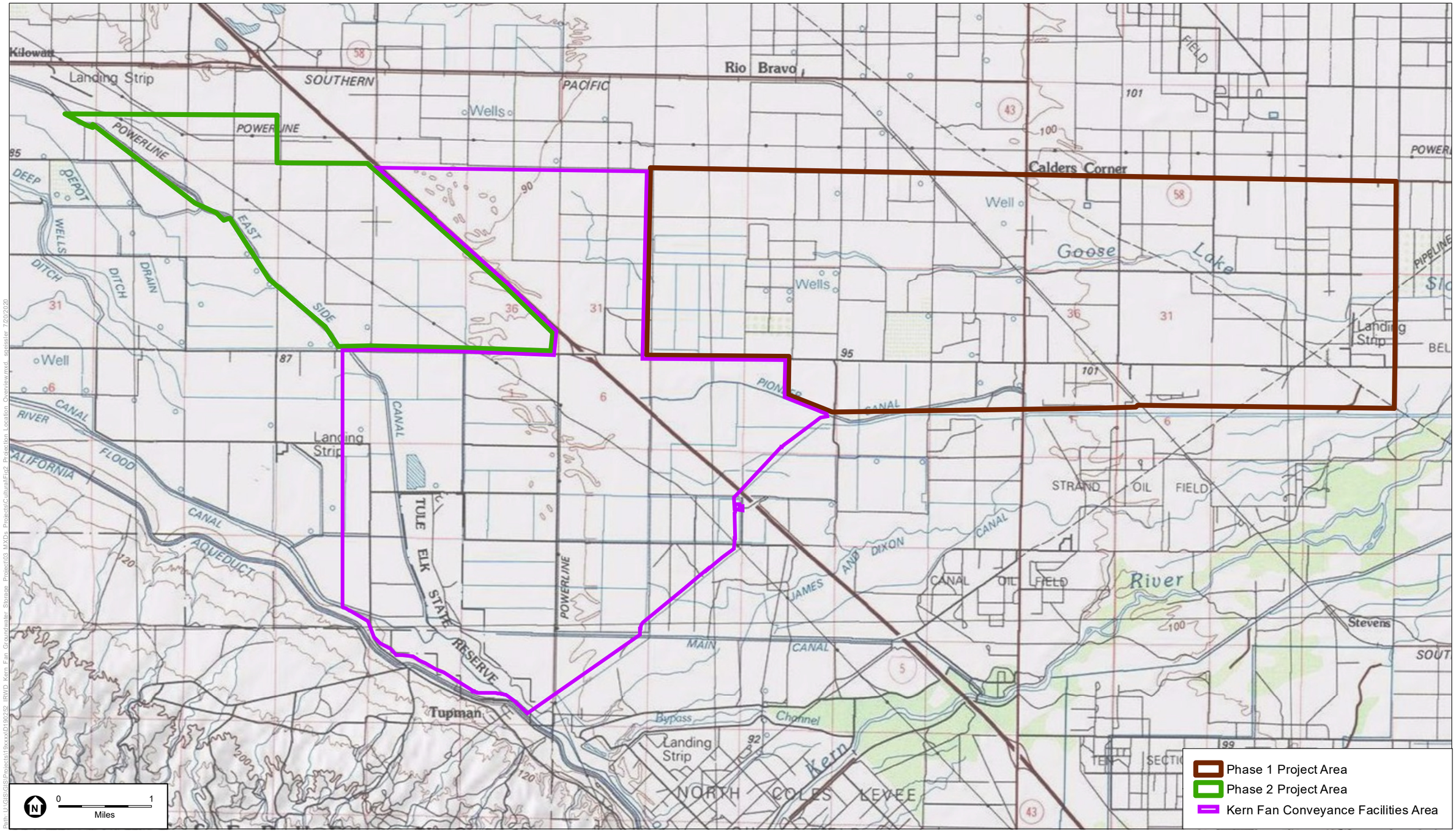


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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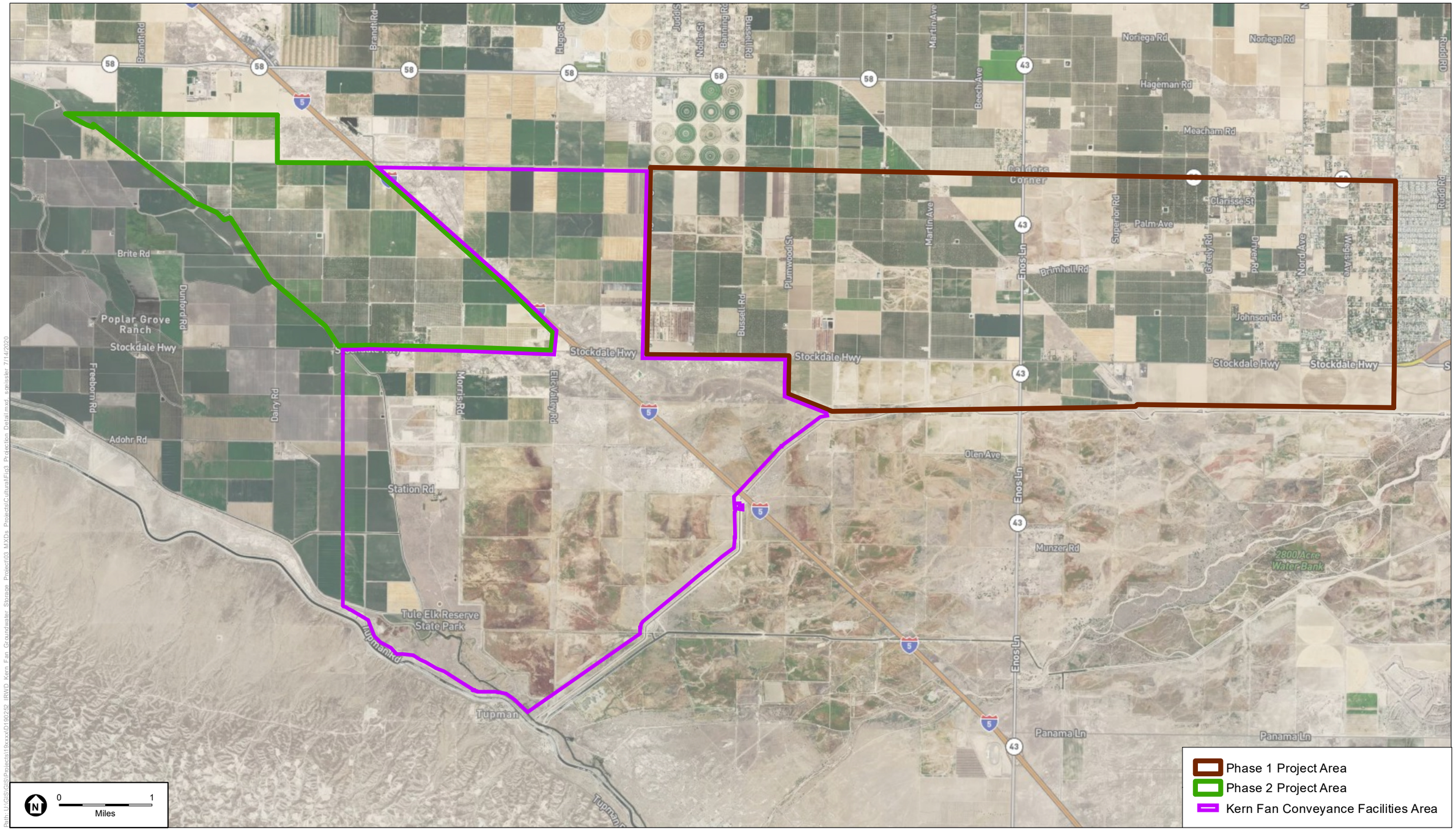
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Jessica Mauck, Director-CRM Department
San Manuel Band of Mission Indians
26569 Community Center Drive
Highland, CA 92346

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Mauck:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

A search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was conducted on May 6, 2020. The results were negative, indicating that the NAHC does not have any sacred sites or Native American cultural resources on file within the proposed project areas (Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area).

In an effort to address any potential impacts to archaeological or Native American resources, we are seeking comments and information from Native American representatives, and your name was supplied to us by the NAHC as a contact for this area. We would appreciate your comments identifying any sensitive sites in or near the proposed project areas that you may be aware of, any concerns or issues pertinent to the proposed project.

If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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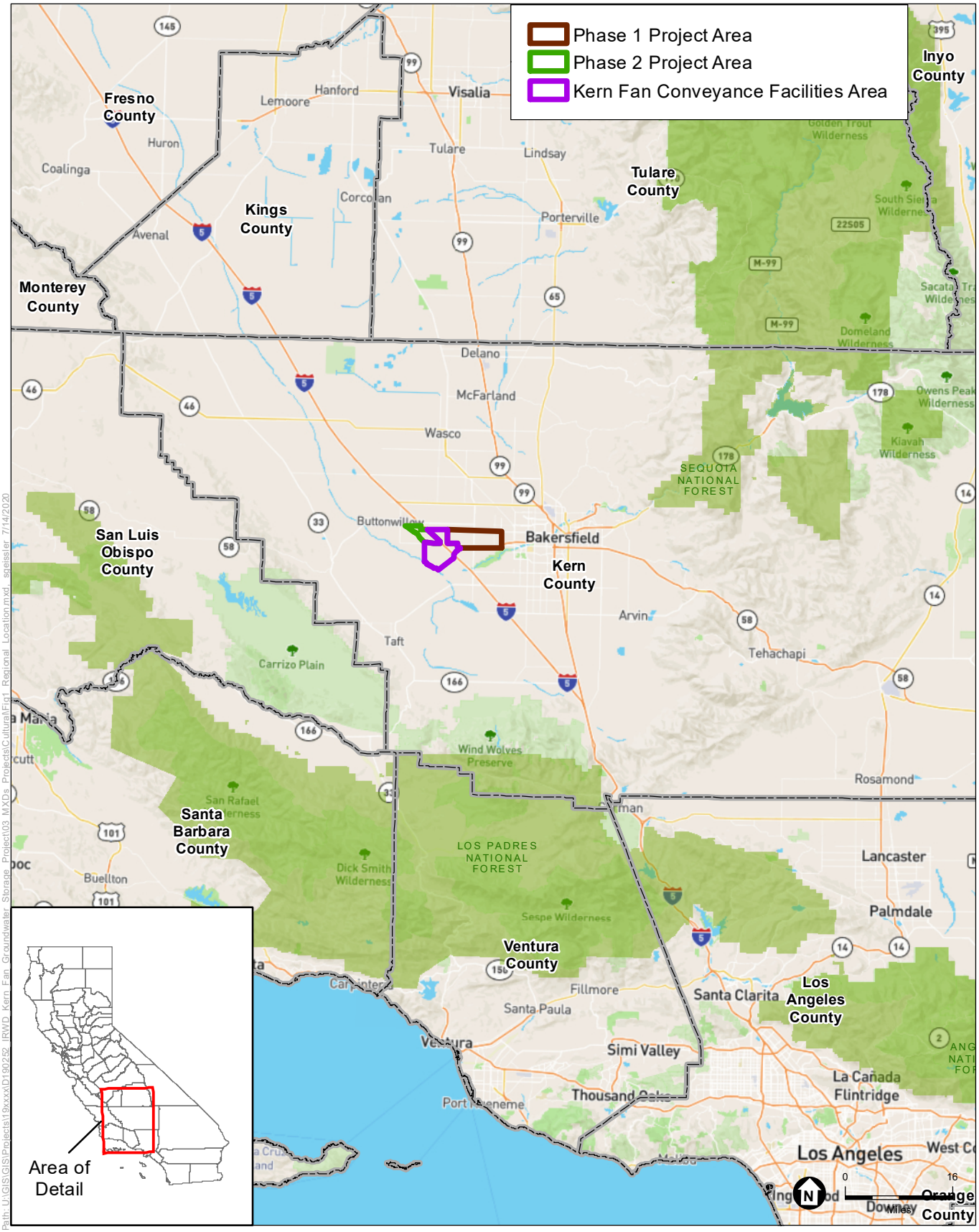
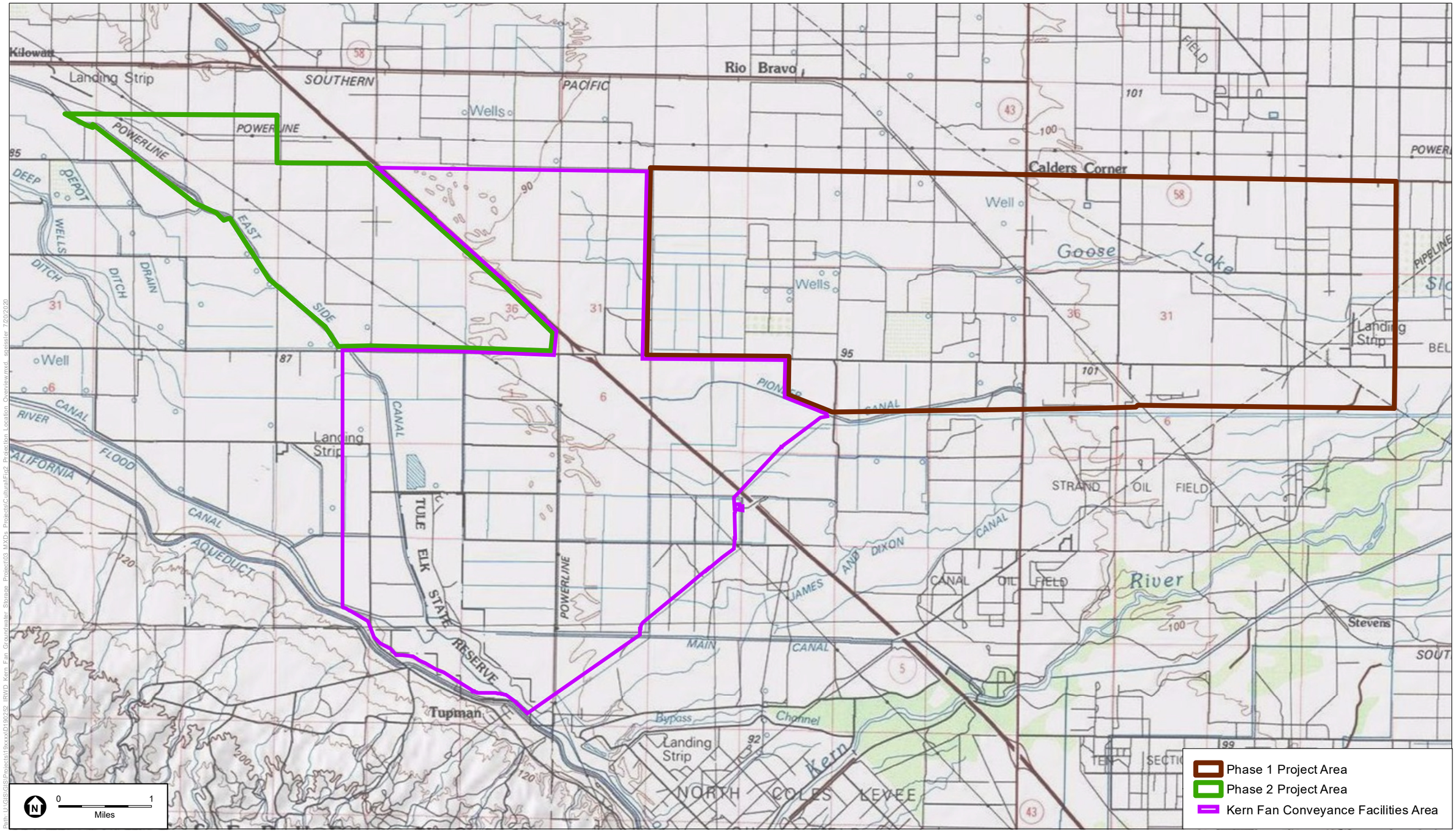


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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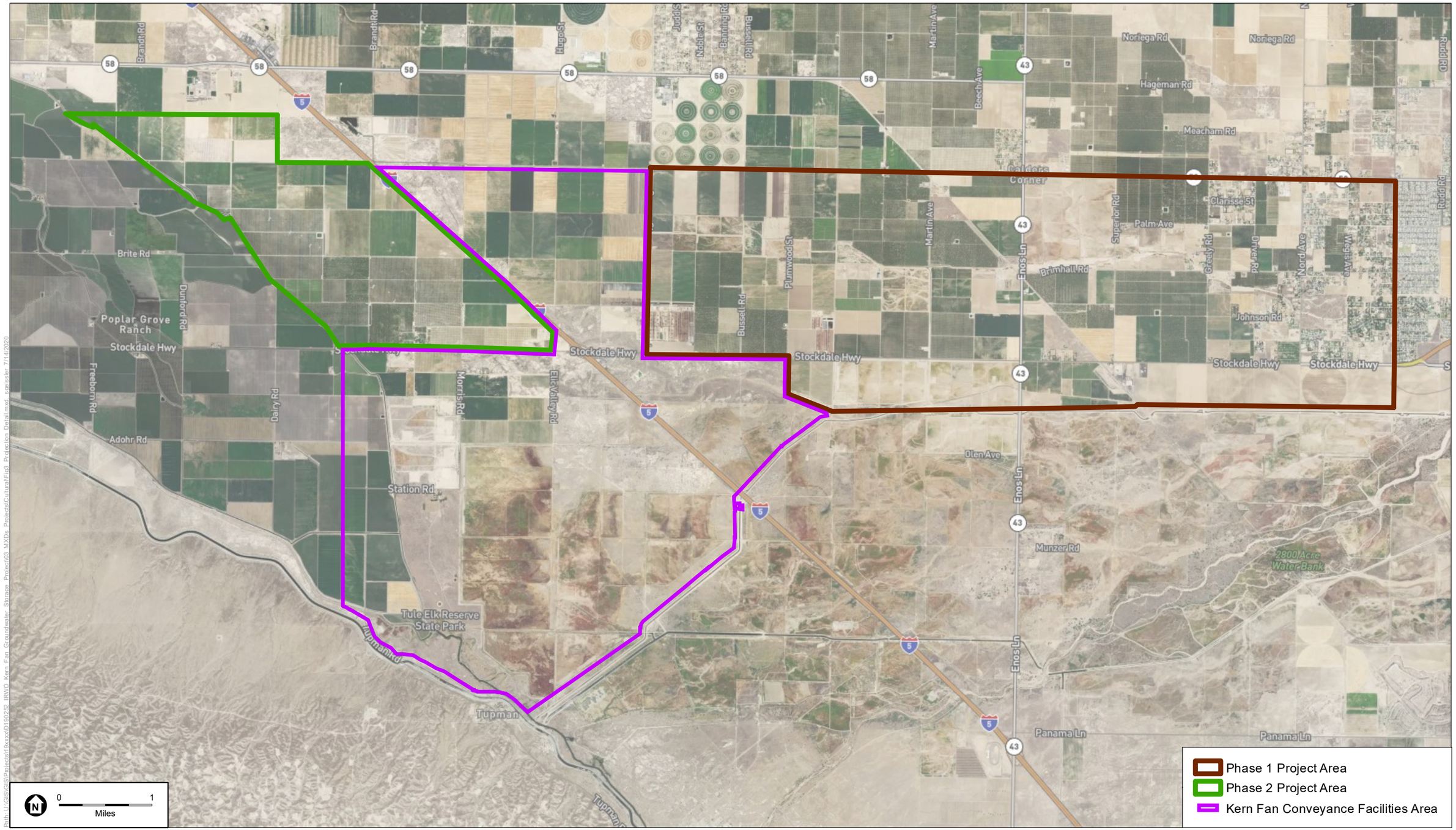
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Neil Pevron, Chairperson
Tule River Indian Tribe
P.O. Box 589
Porterville, CA 93258

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Pevron:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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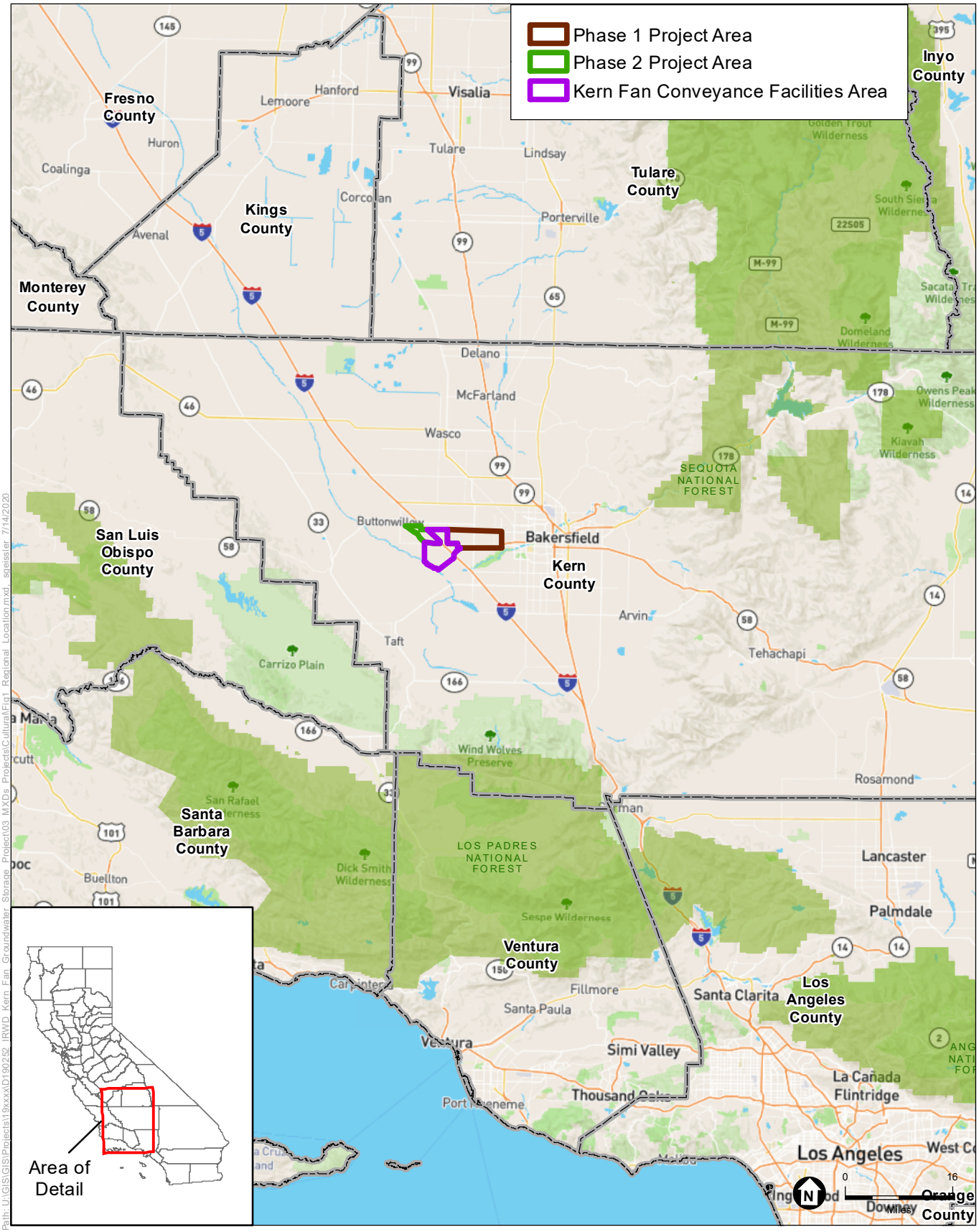
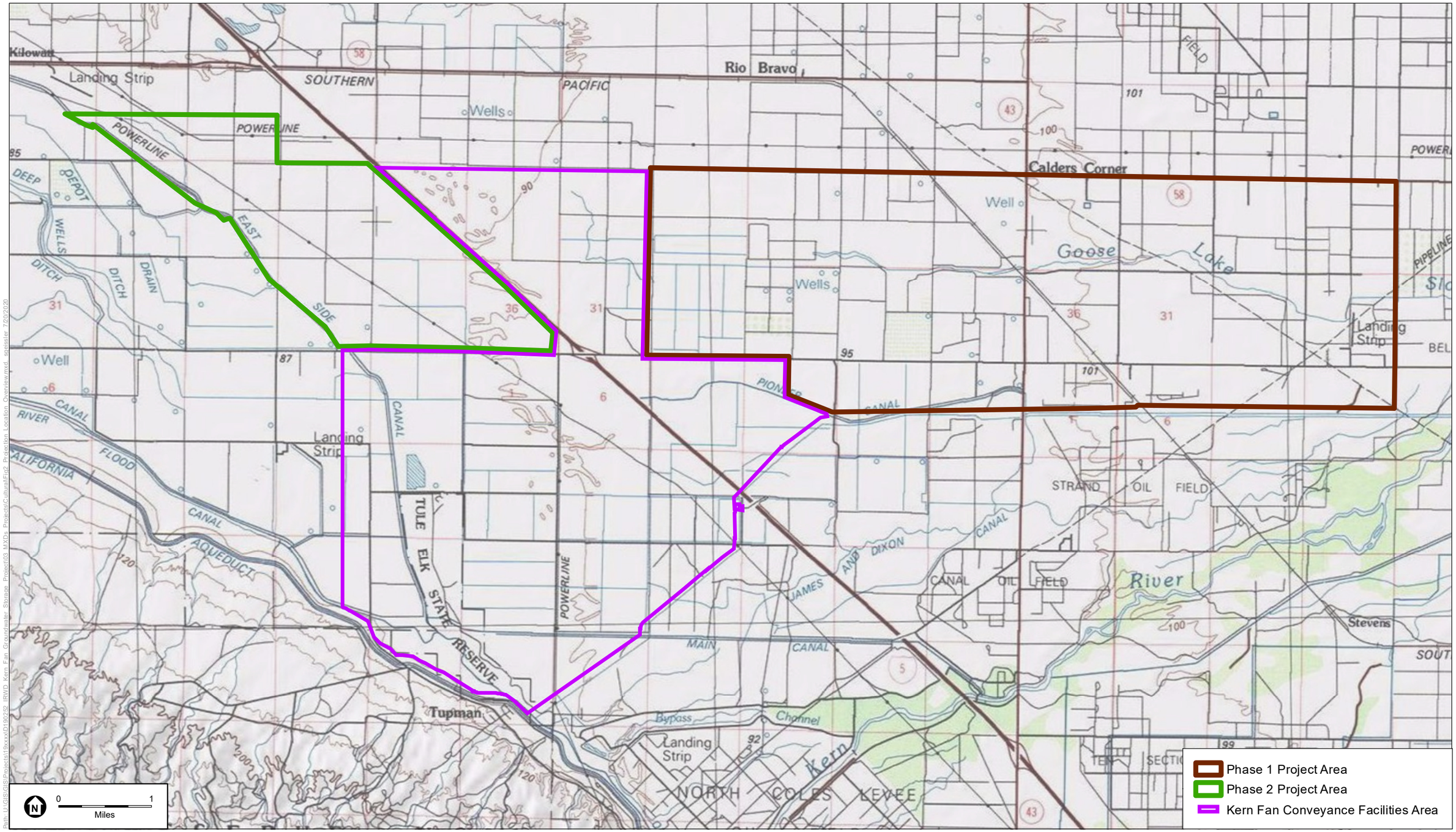


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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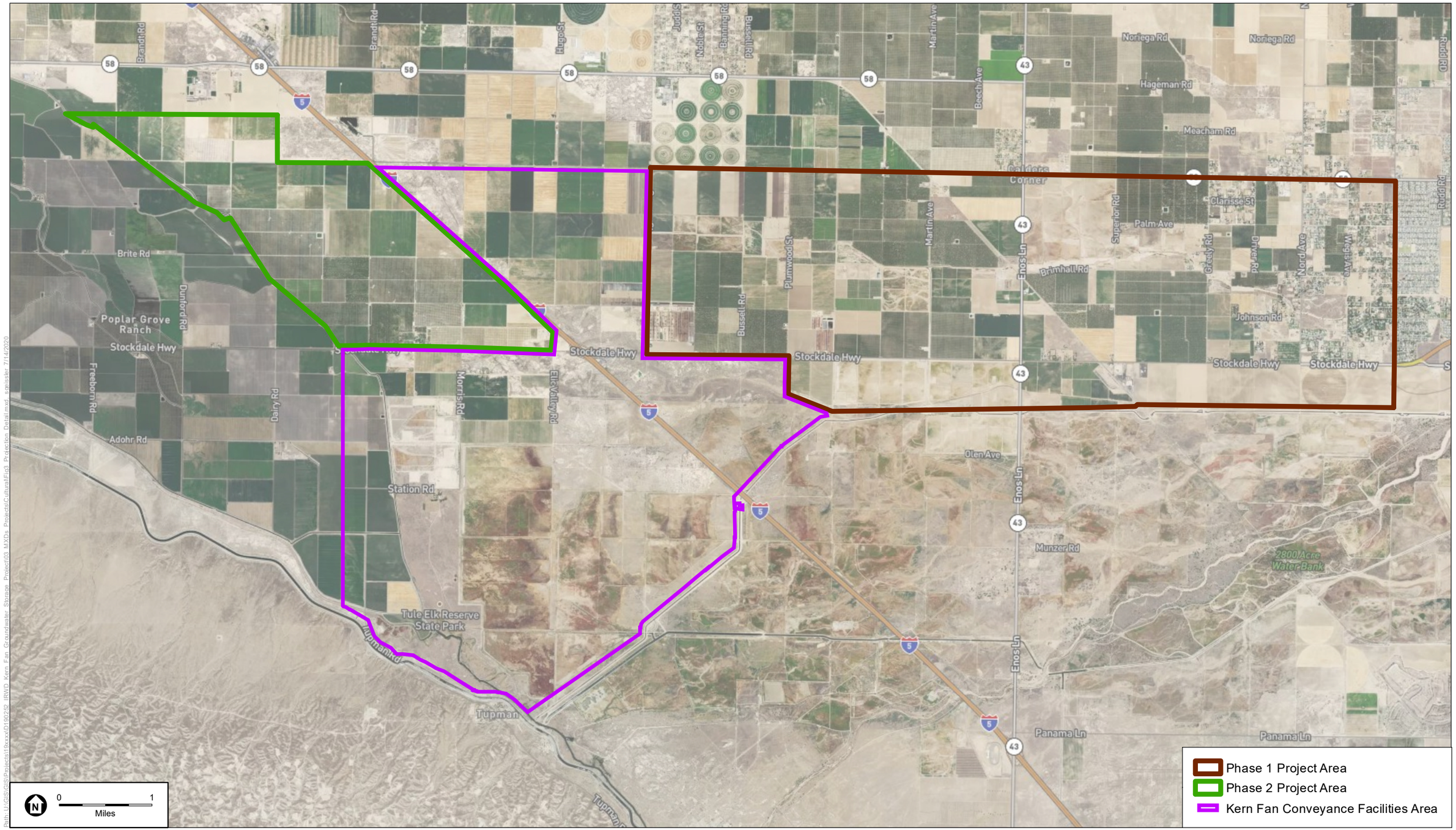
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Julio Quair, Chairperson
Chumash Council of Bakersfield
729 Texas Street
Bakersfield, CA 93307

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Quair:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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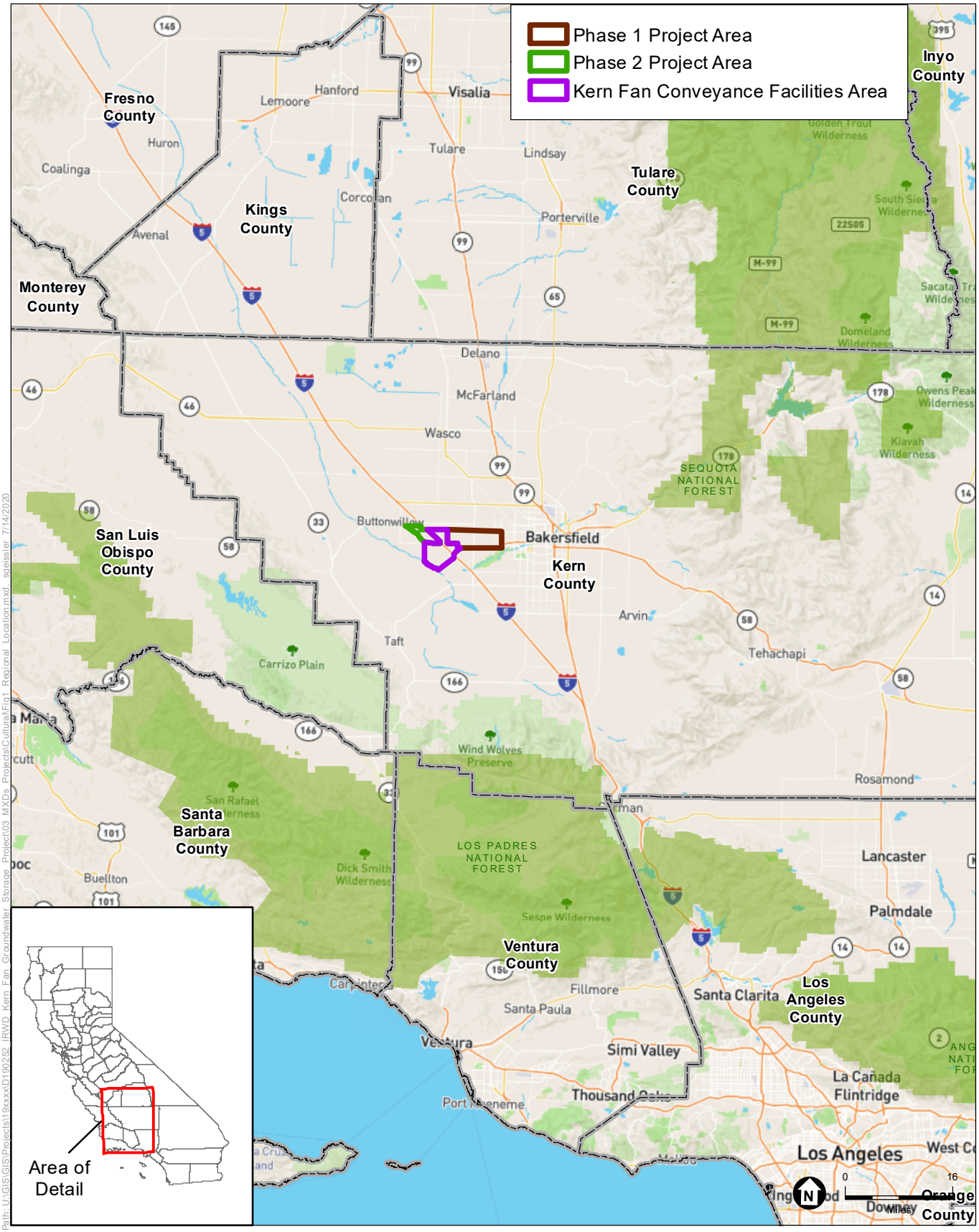
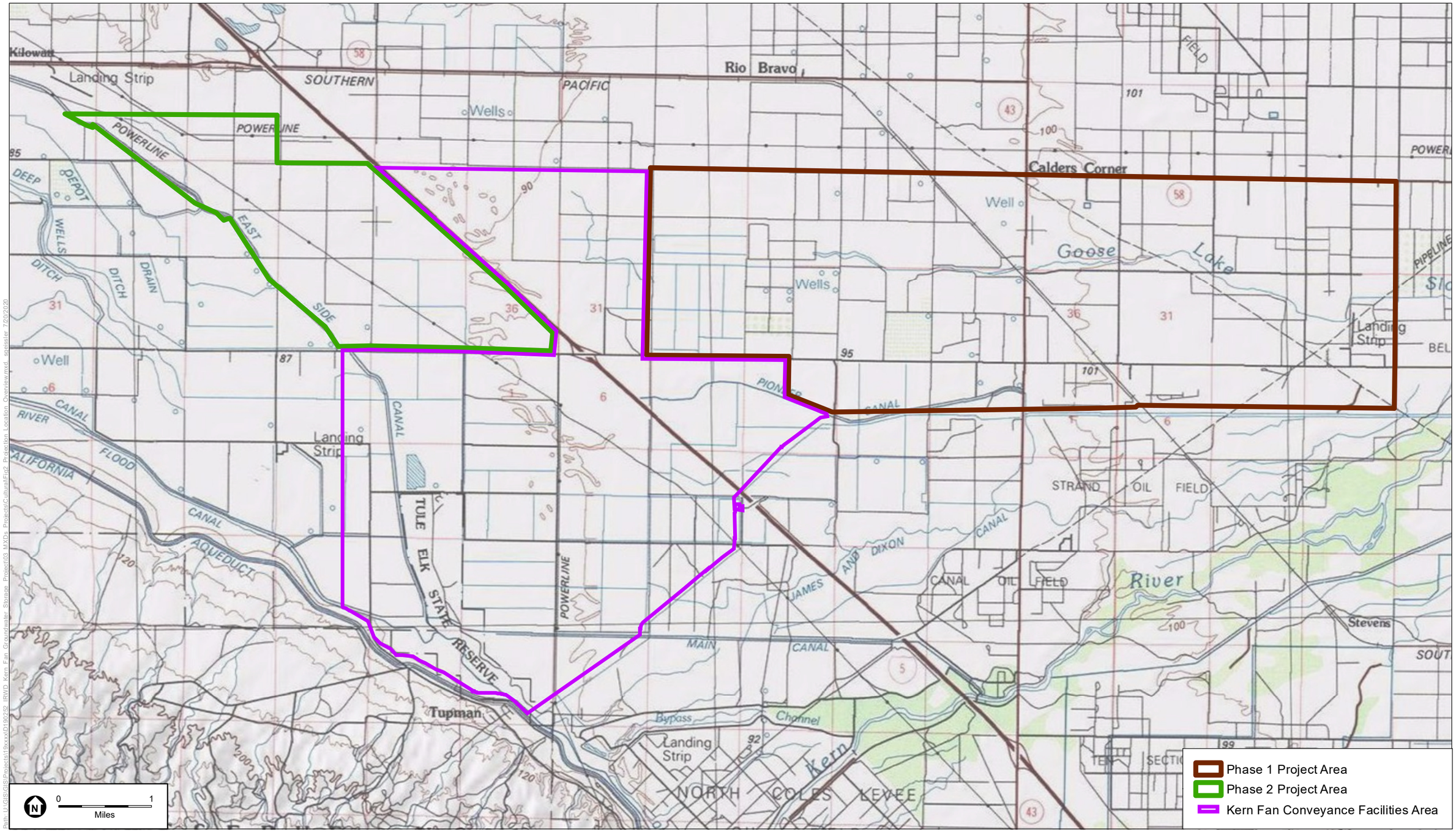


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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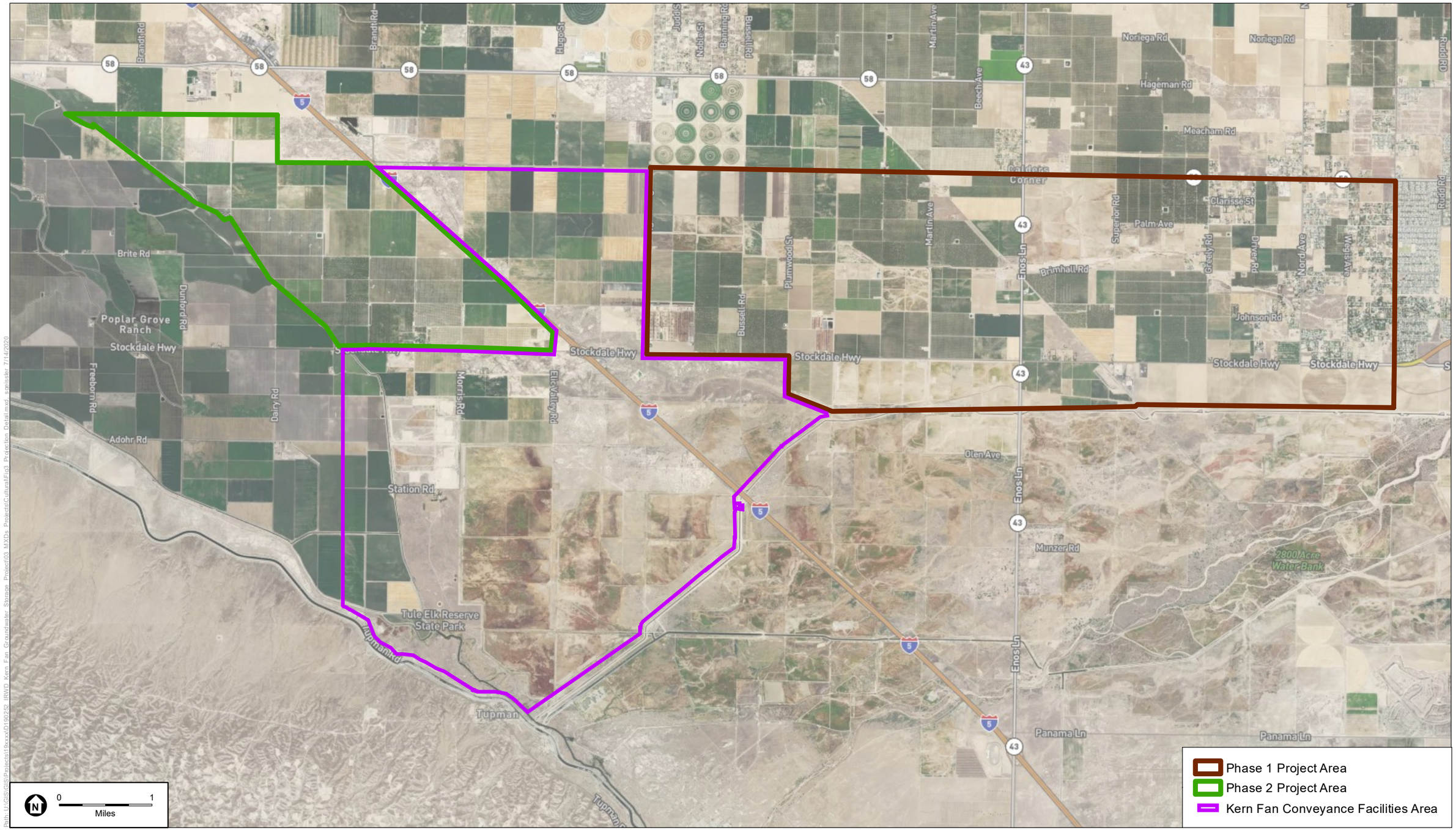
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

James Rambeau, Sr., Chairperson
Big Pine Paiute Tribe of the Owens Valley
P.O. Box 700
Big Pine, CA 93513

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Rambeau:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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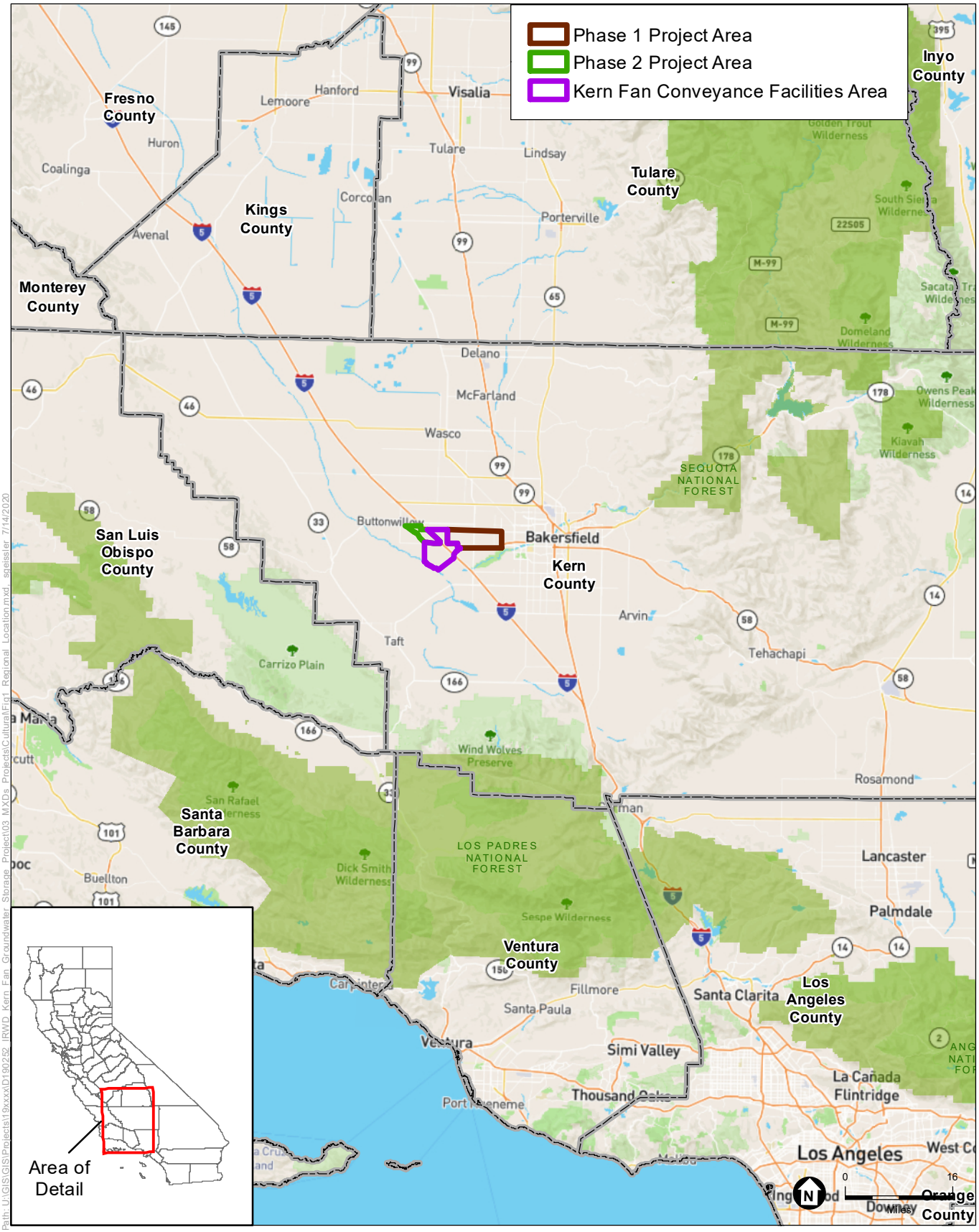
If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

Enclosures: Figure 1 – Regional Location
Figure 2 – Project Location
Figure 3 – Project Detail

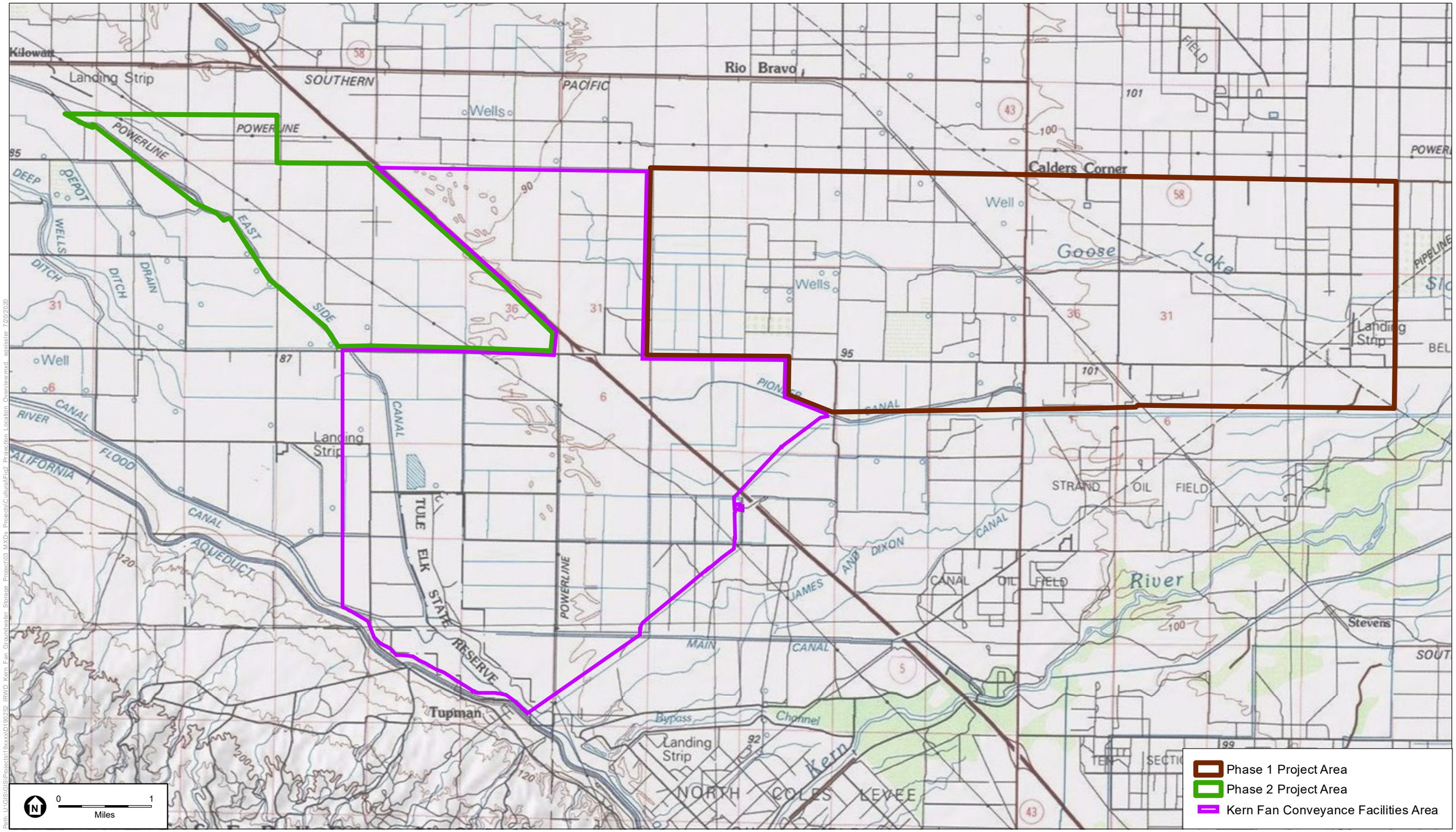


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



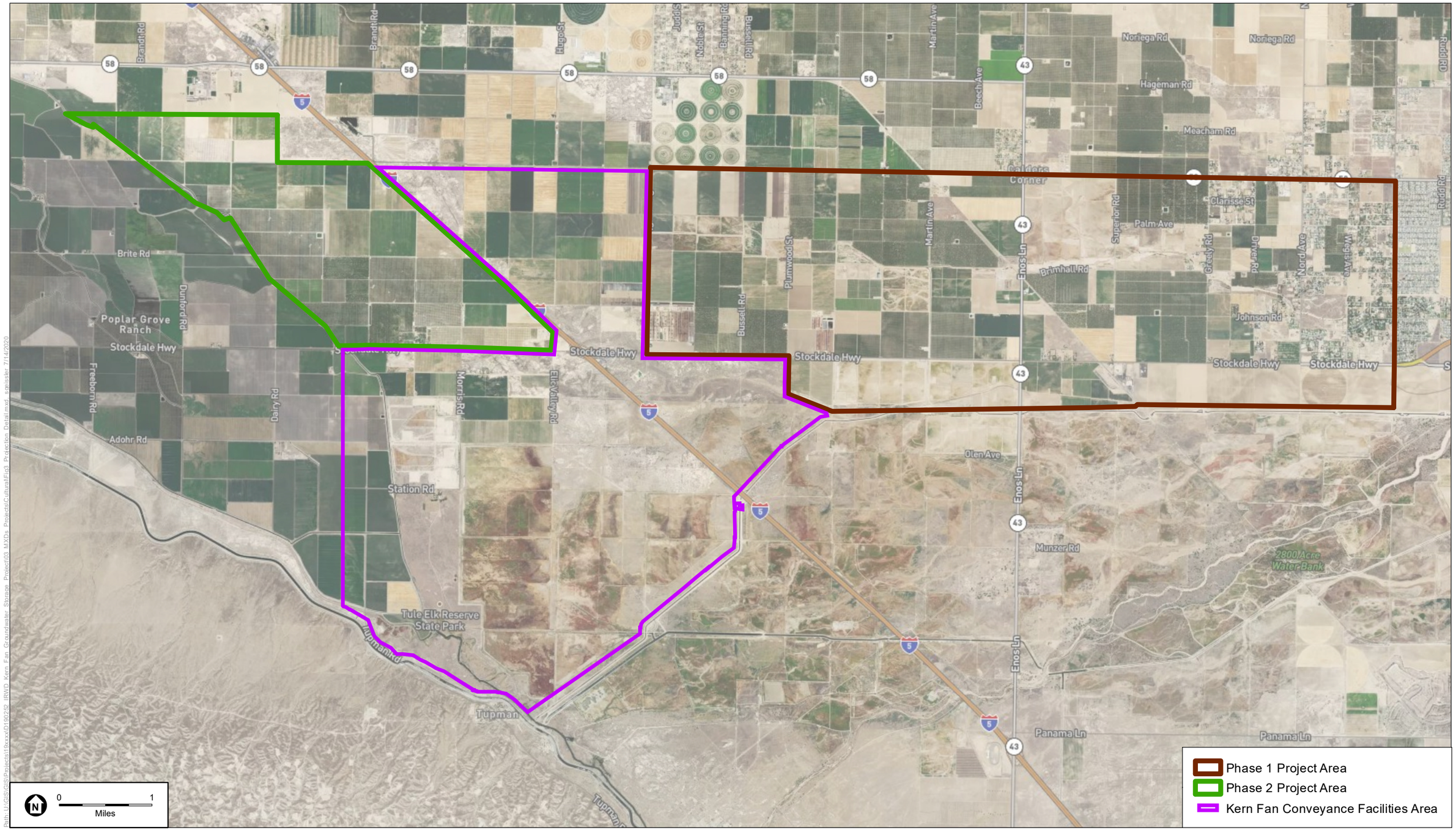
Path: U:\GIS\GIS\Projects\19xxxx\D190252 IRWD Kern Fan Groundwater Storage Project\03 MXDs Projects\Cultural\Fig2 Projection Location Overview.mxd, saeissler 7/20/2020

SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Colin Rambo, CRM Tech
Tejon Indian Tribe
P.O. Box 640
Arvin, CA 93203

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Mr. Rambo:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

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Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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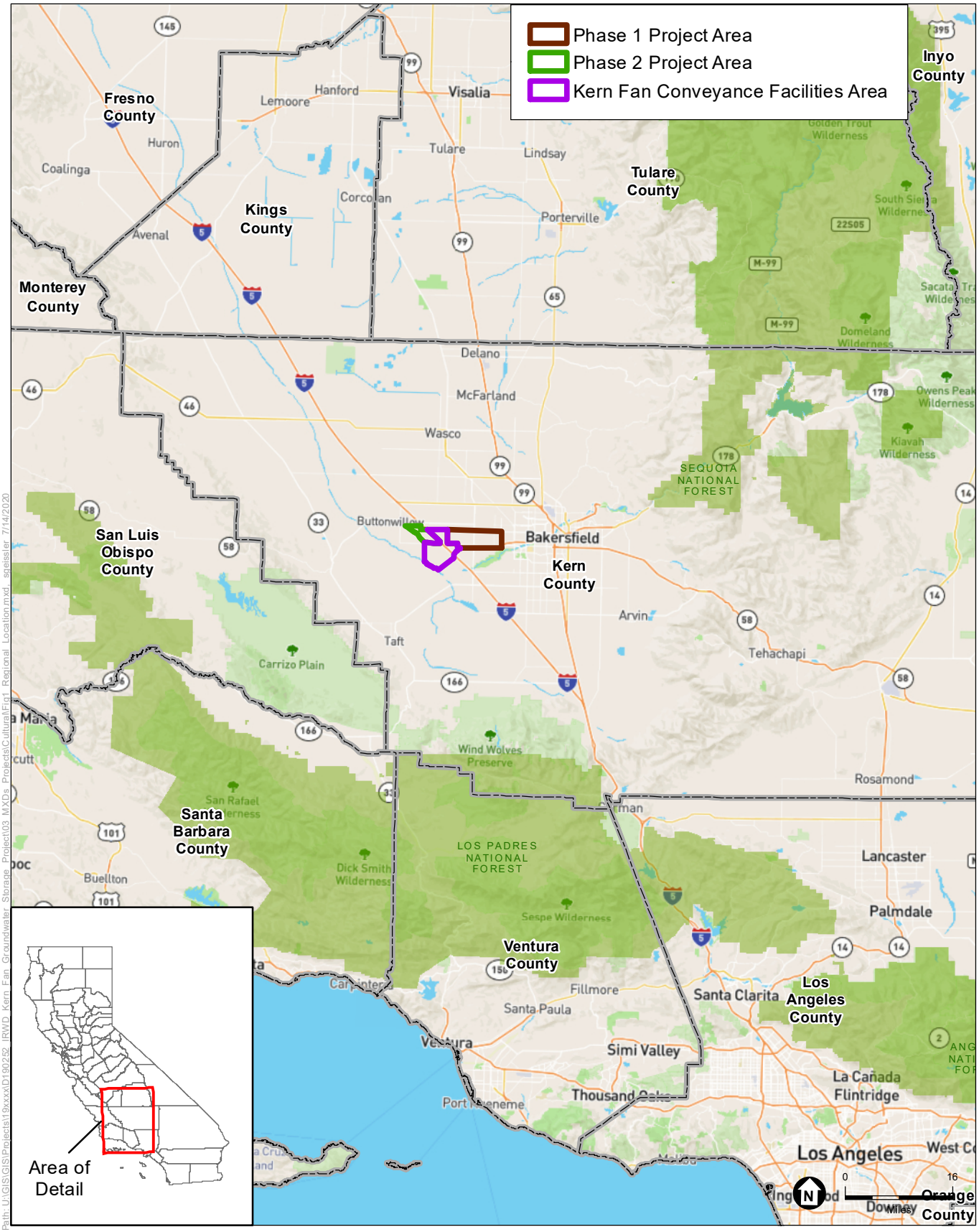
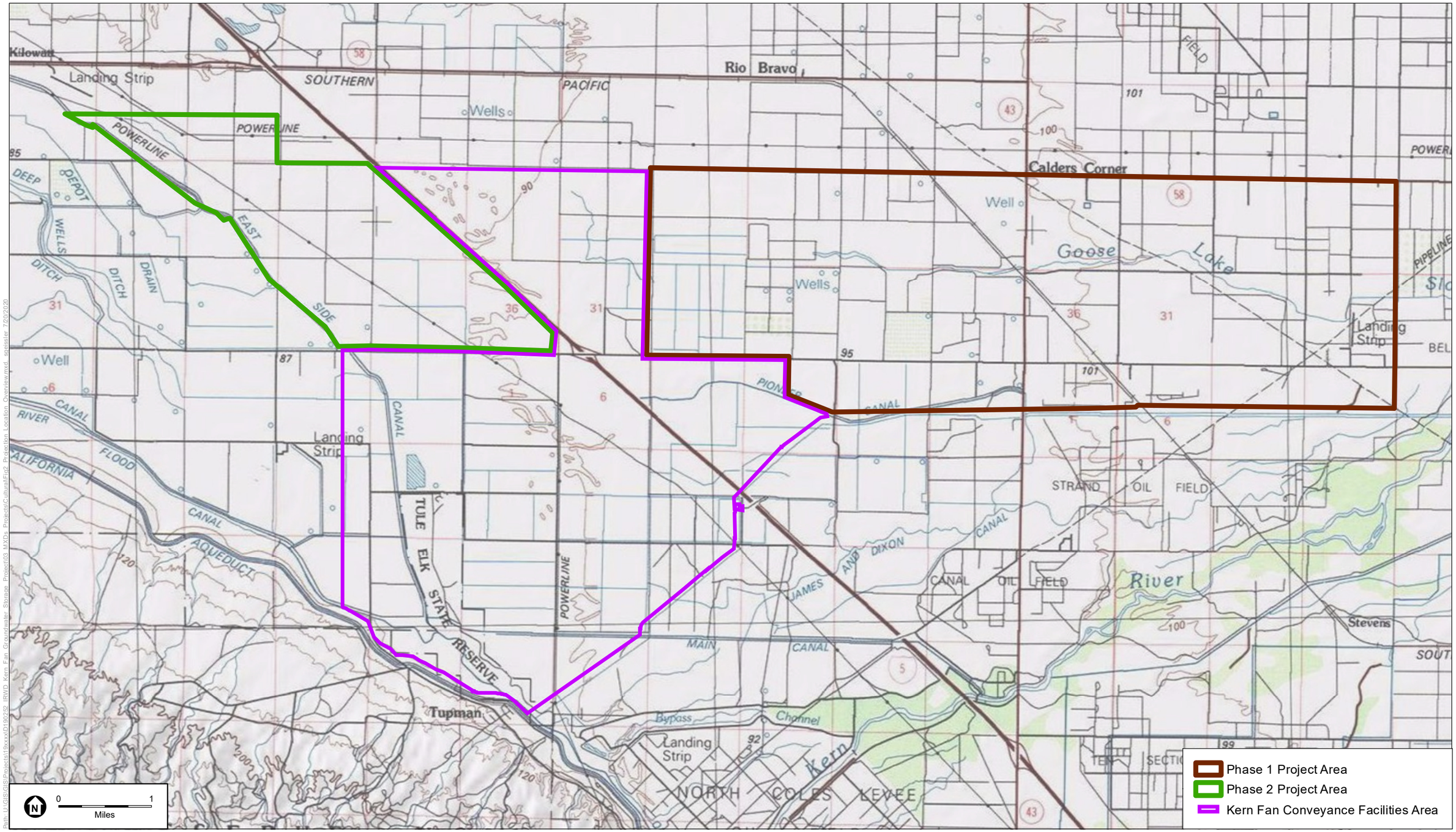


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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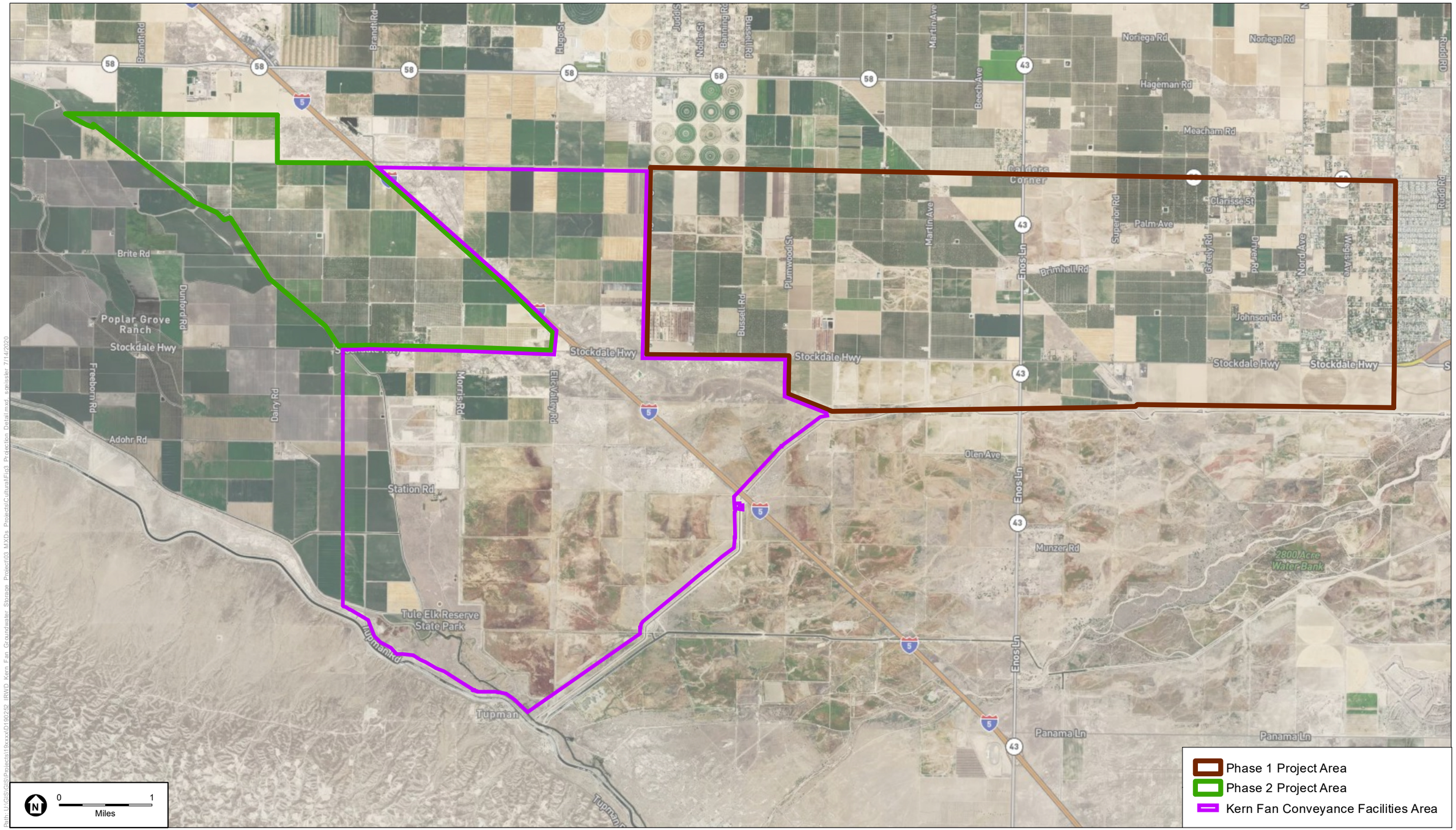
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Robert Robinson, Chairperson
Kern Valley Indian Community
P.O. Box 1010
Lake Isabella, CA 93240

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Robinson:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

A search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was conducted on May 6, 2020. The results were negative, indicating that the NAHC does not have any sacred sites or Native American cultural resources on file within the proposed project areas (Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area).

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If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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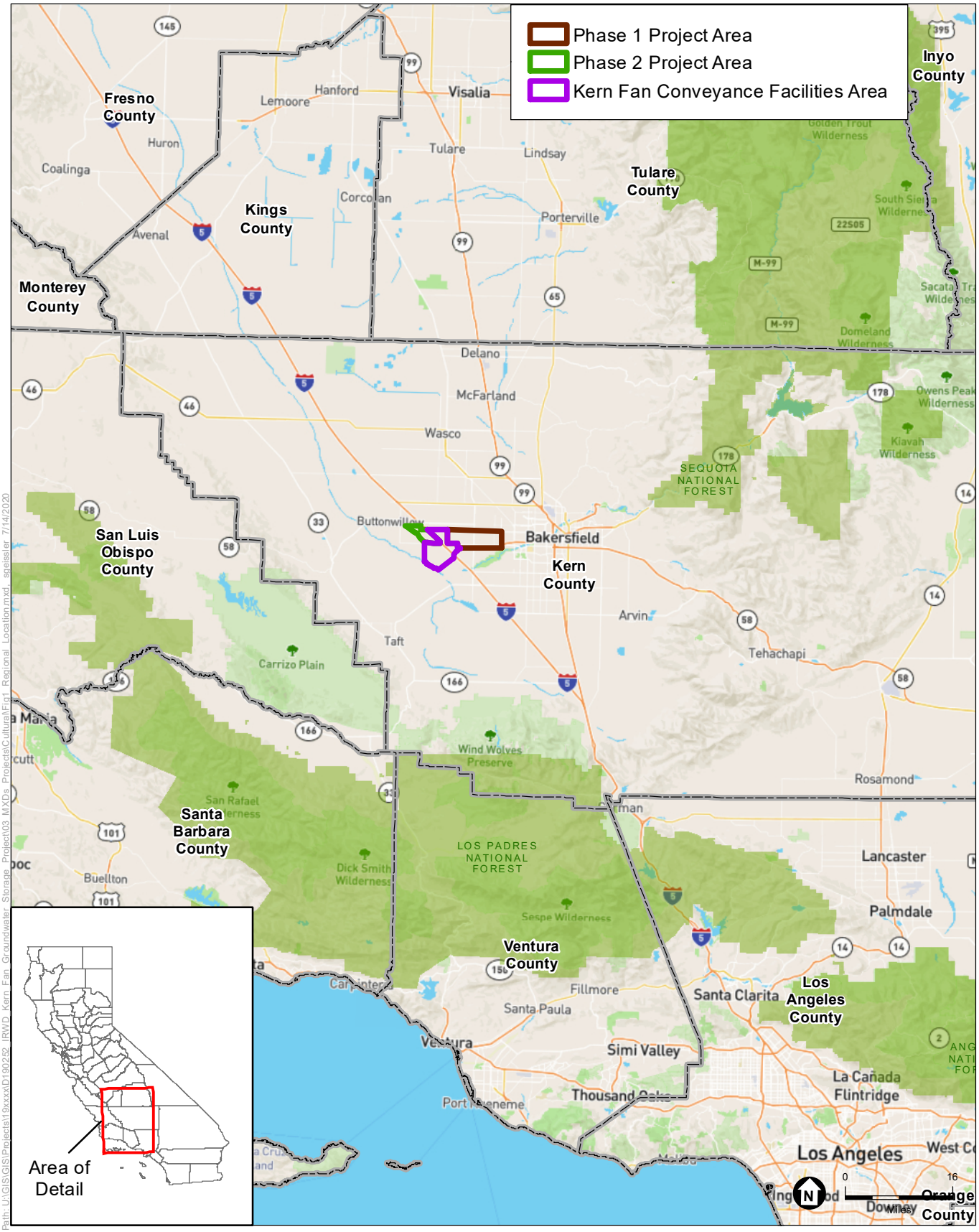
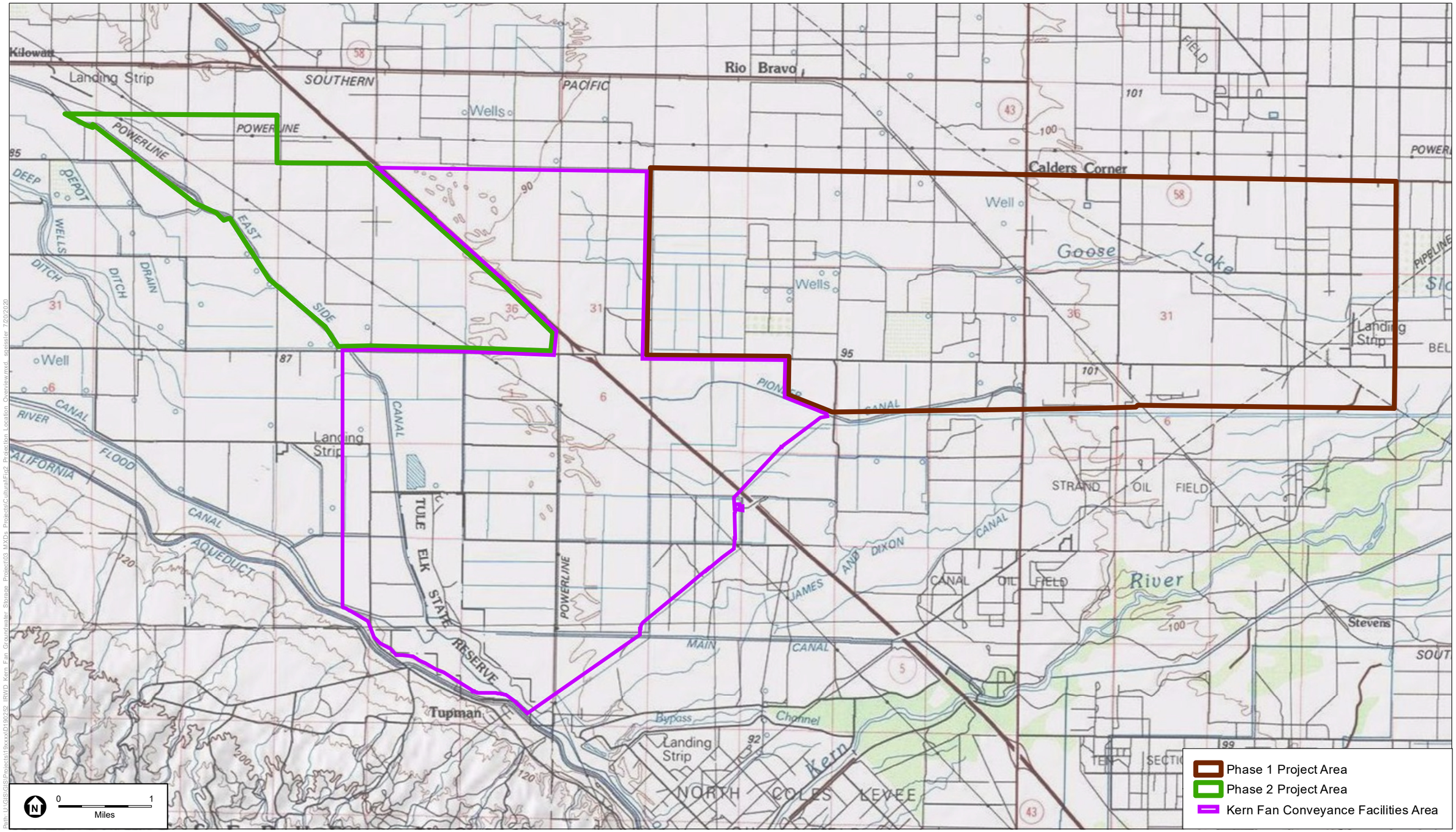


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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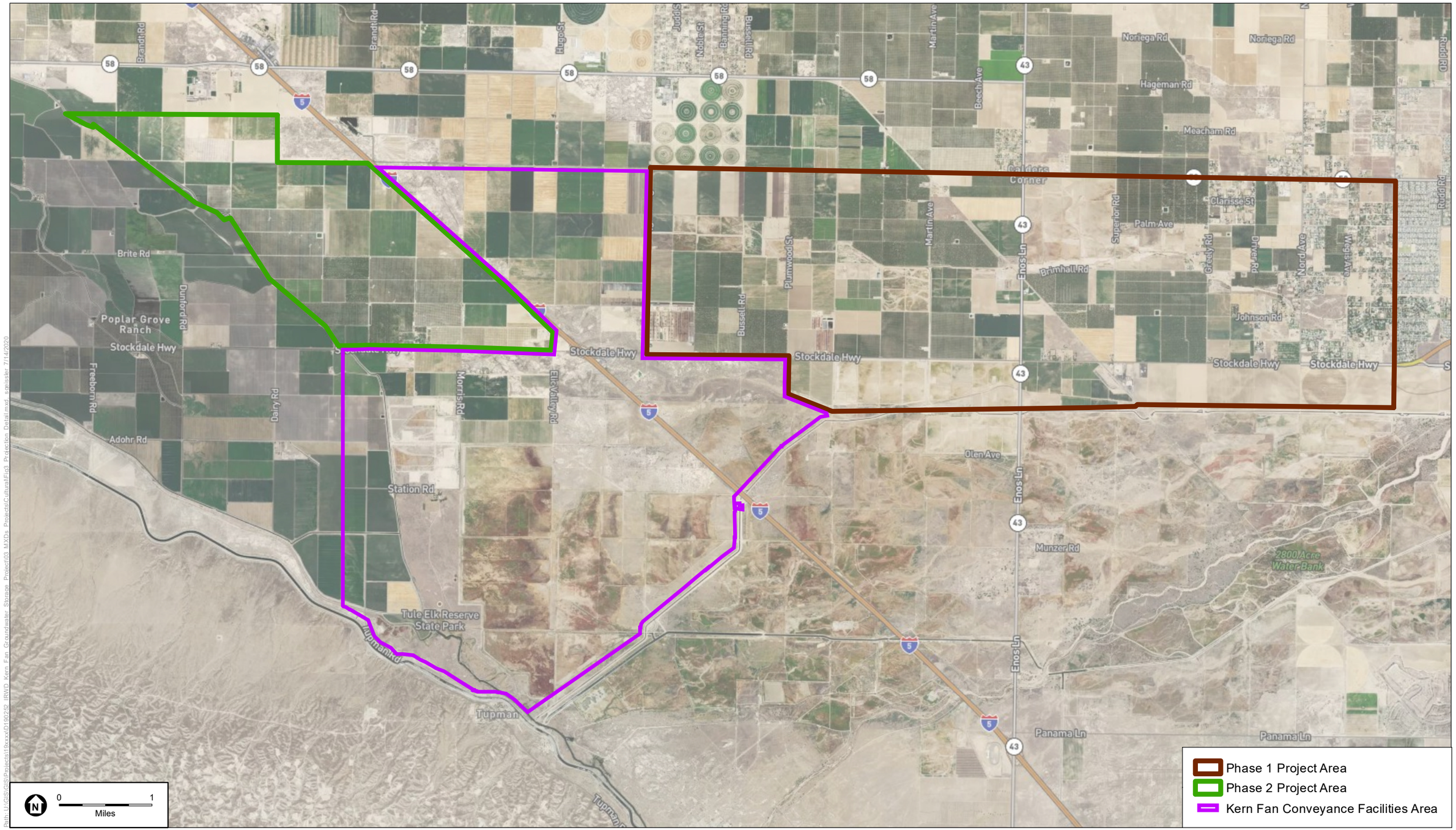
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Leo Sisco, Chairpeson
Santa Rosa Rancheria Tachi Yokut Tribe
P.O. Box 8
Lemoore, CA 93245

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Sisco:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Candace Ehringer

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Cultural Resources Program Manager

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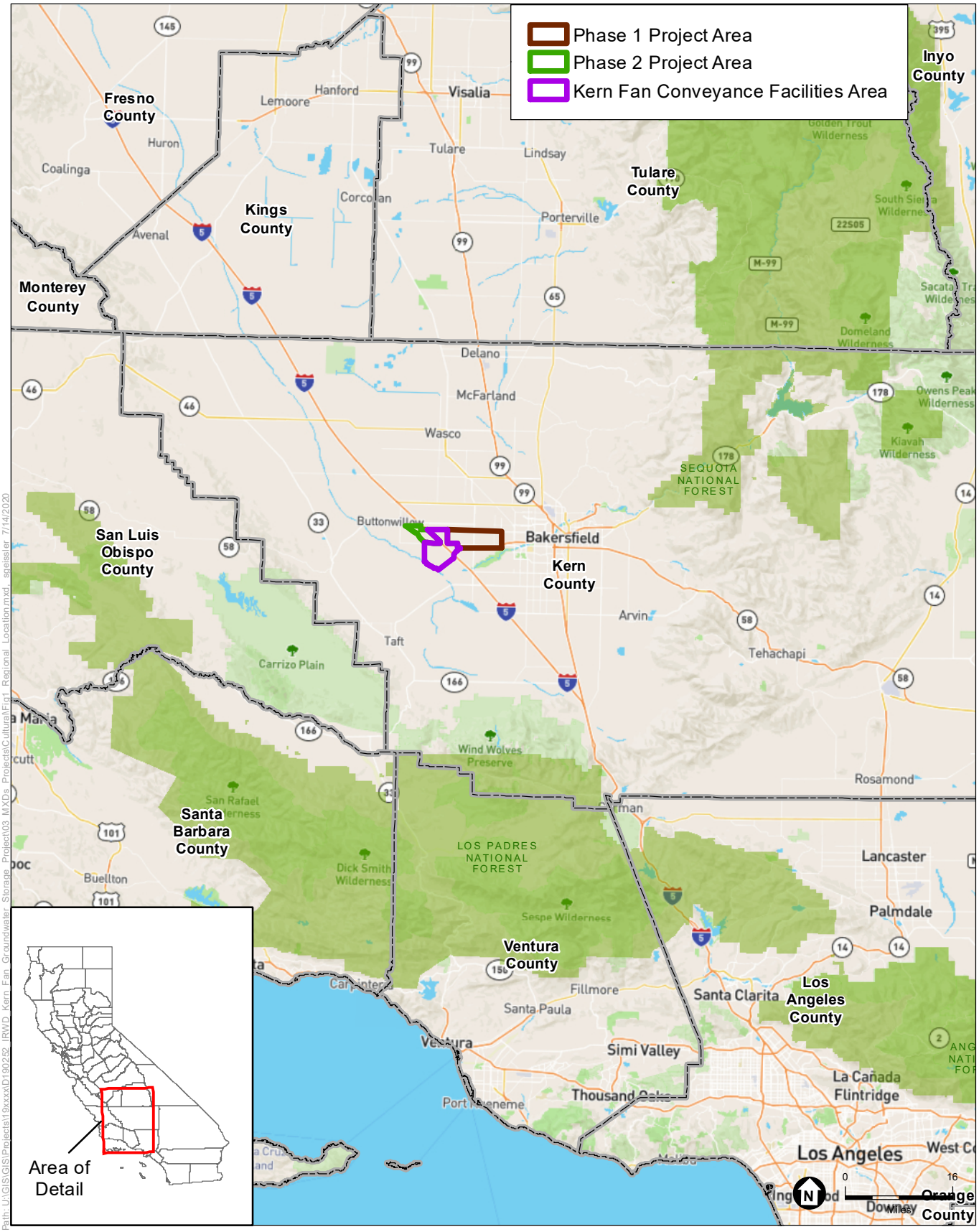
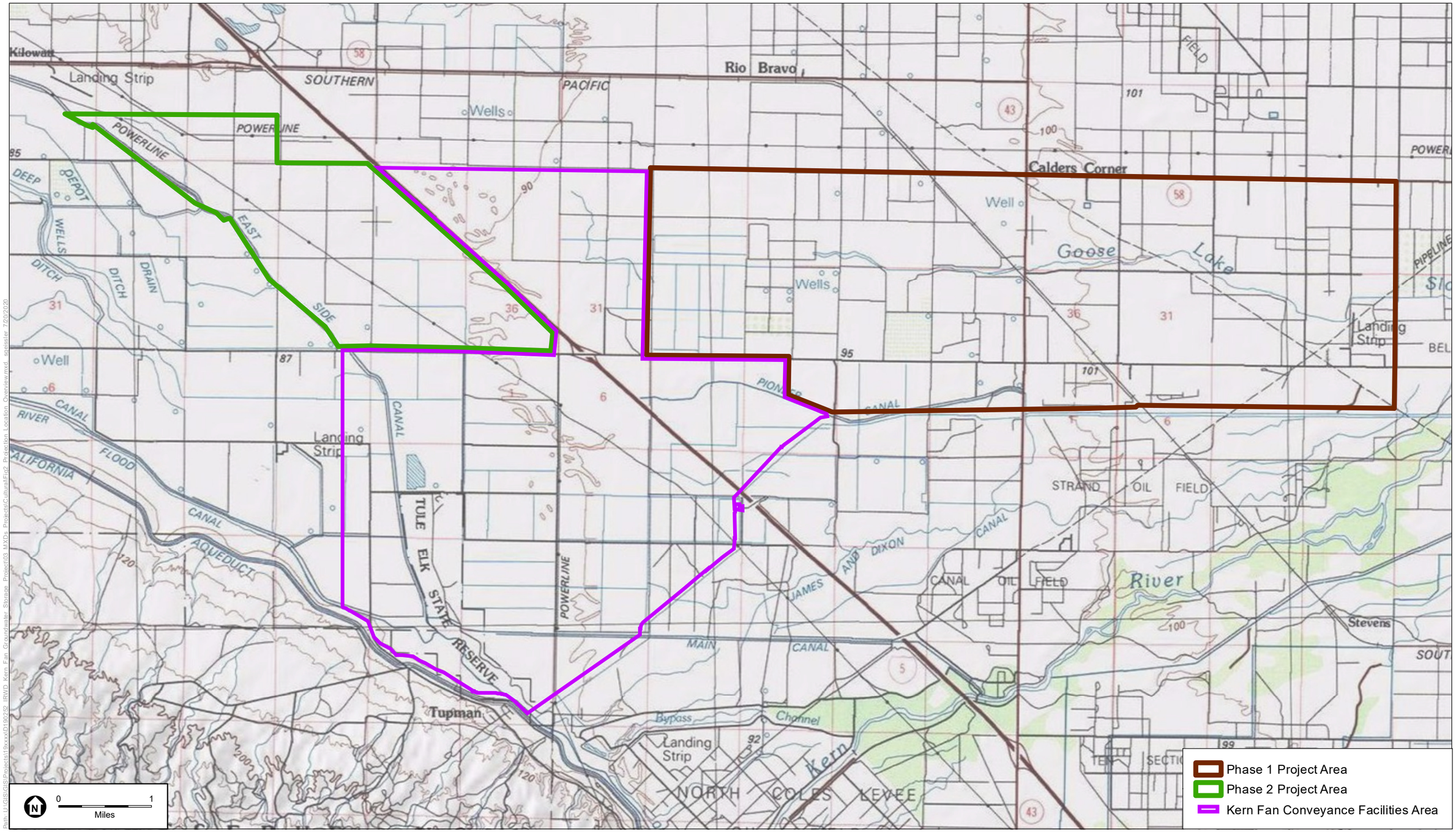


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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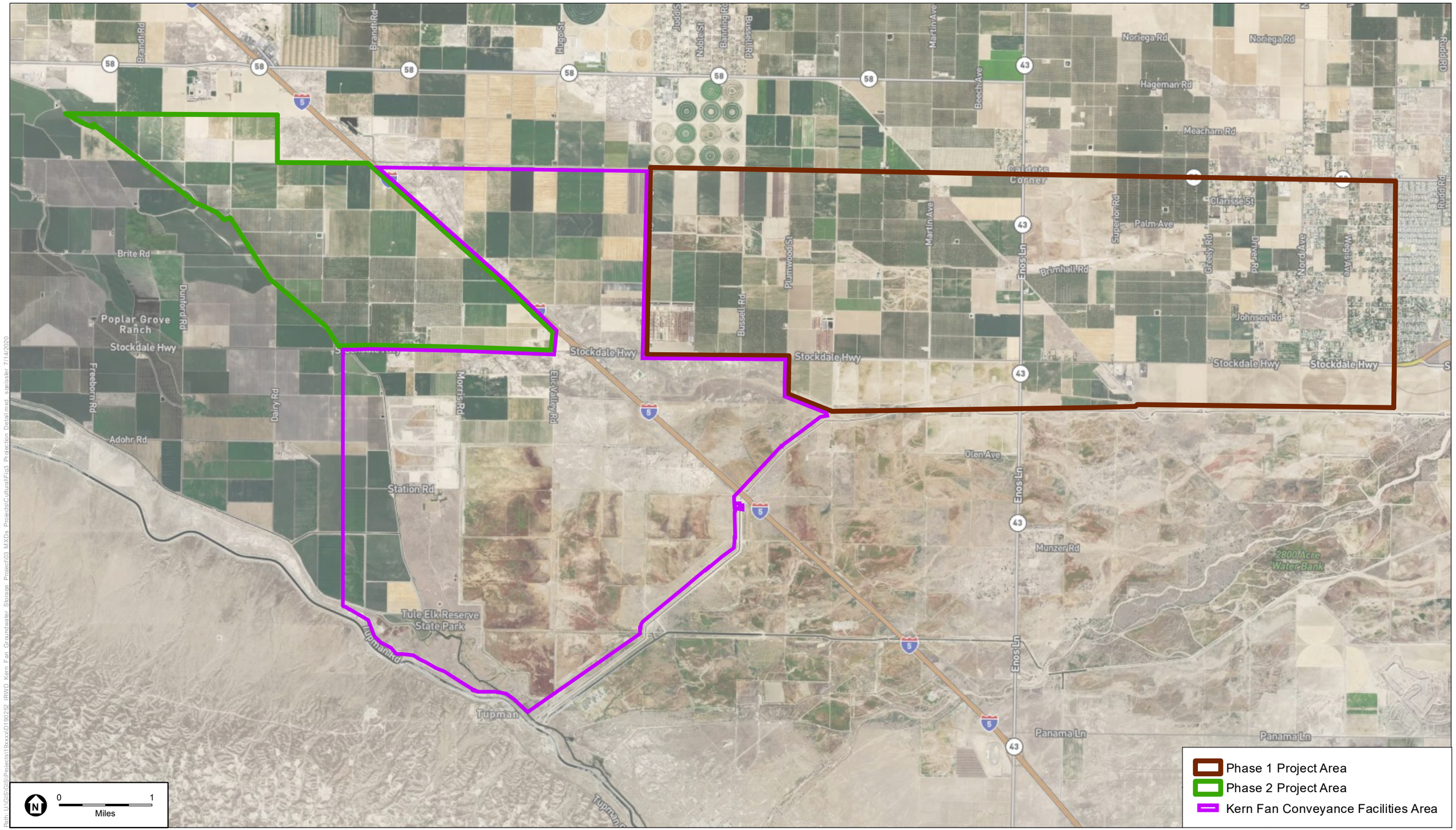
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Mona Olivas Tucker, Chairwoman
Yak tityu tityu yak tilhini – Northern Chumash Tribe
660 Camino del Rey
Arroyo Grande, CA 93420

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairwoman Olivas Tucker:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

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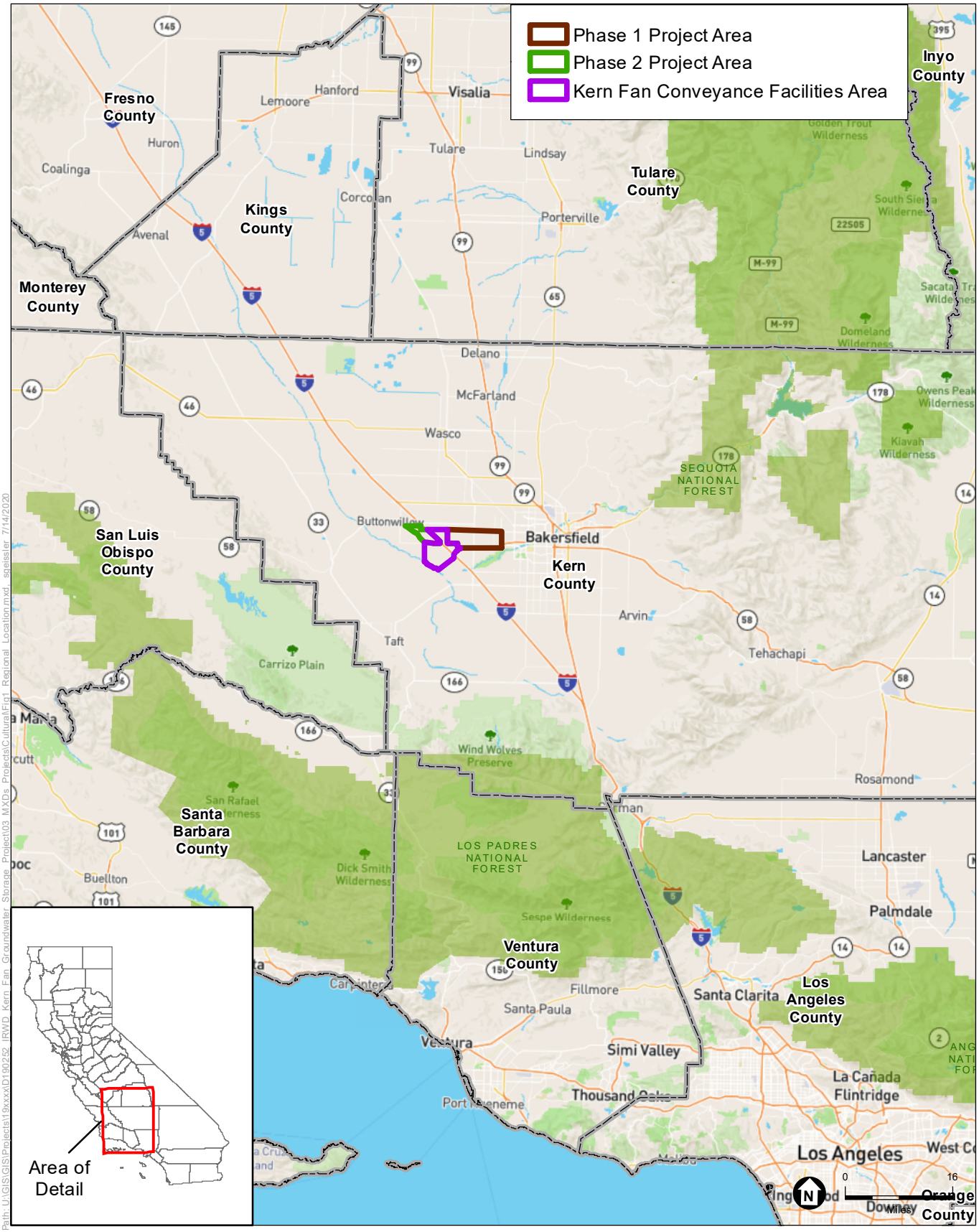

SOURCE: ESRI.

Kern Fan Groundwater Storage Project

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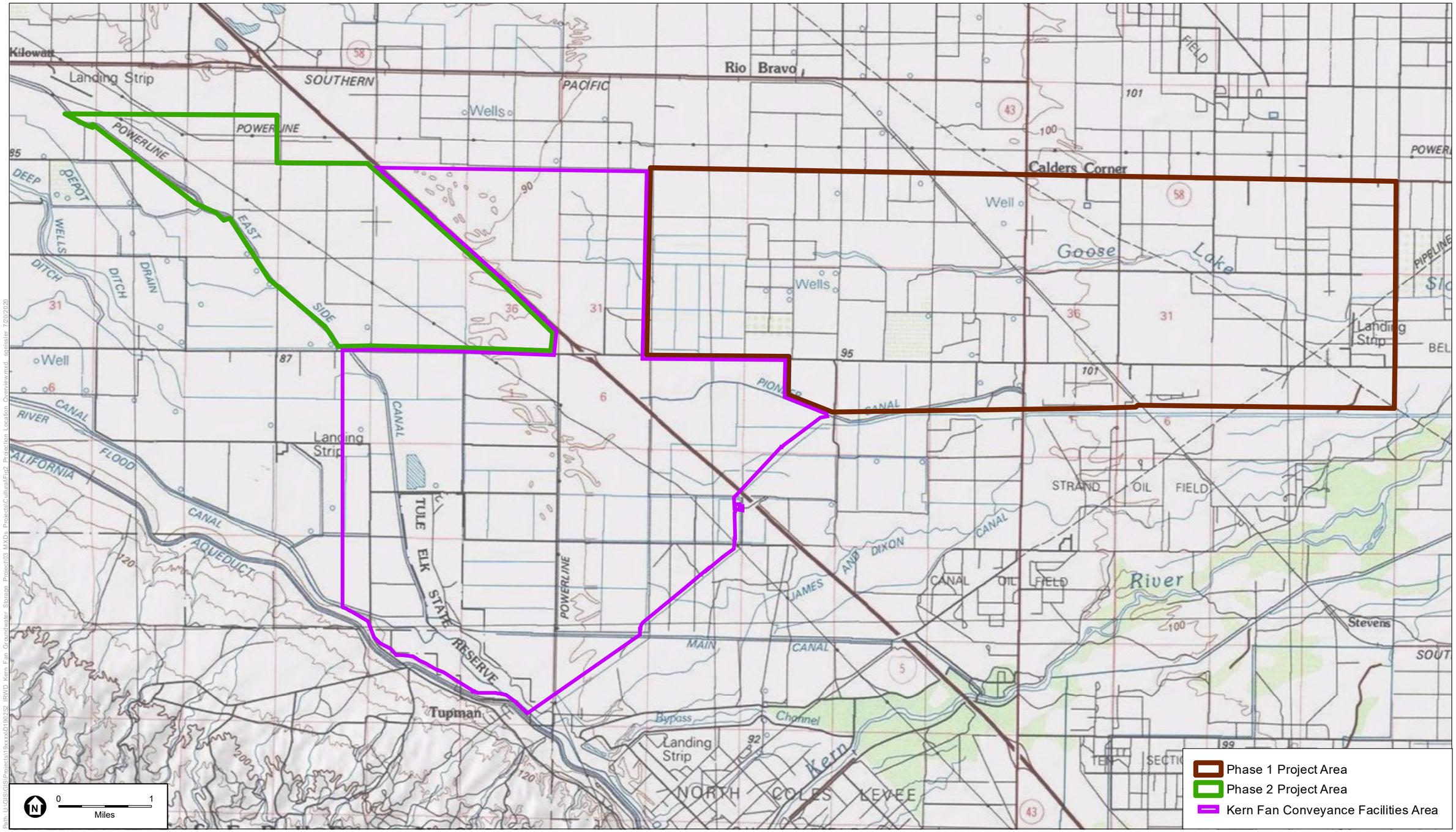
Regional Location

ESA



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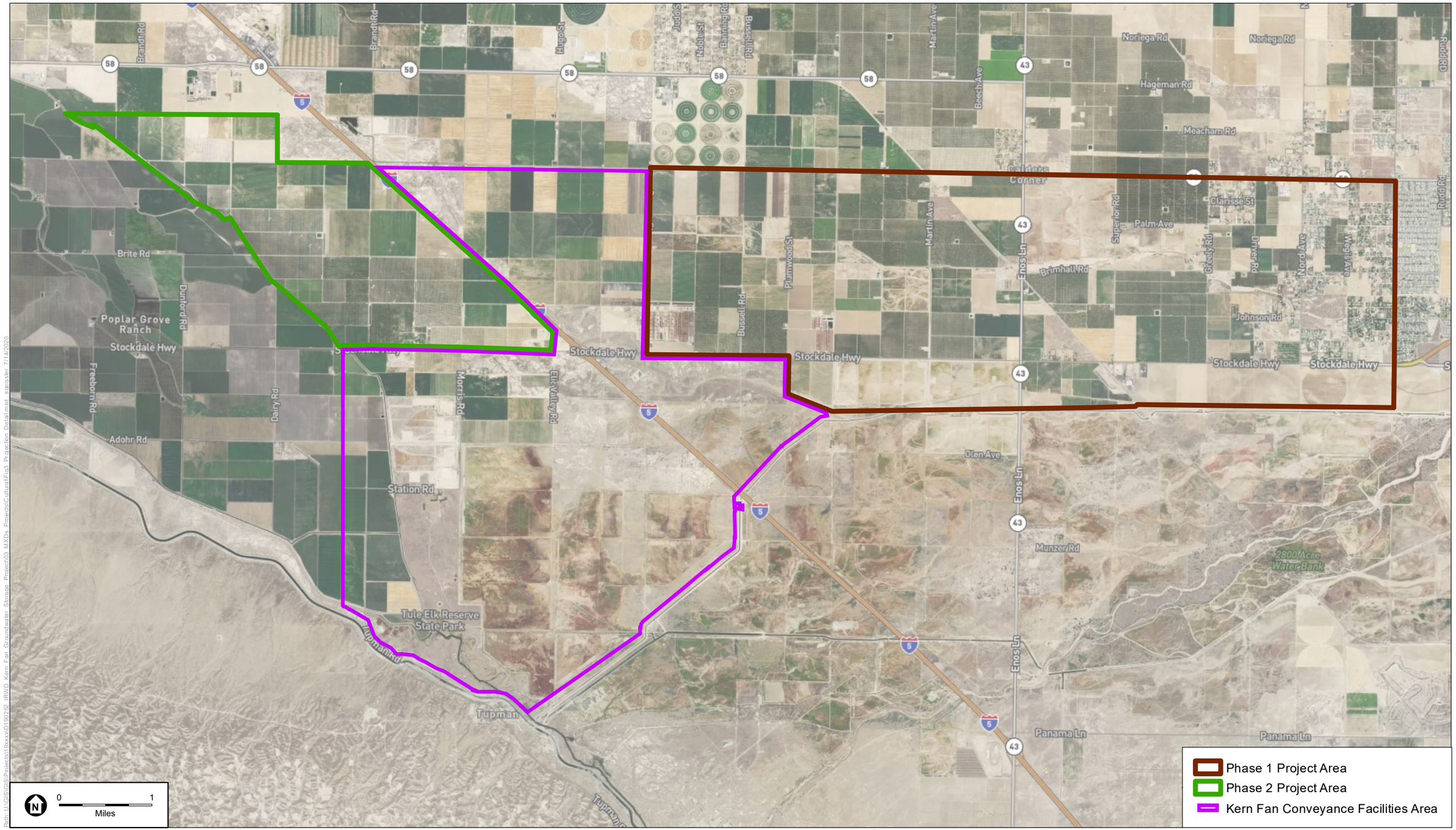
Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Julie Turner, Secretary
Kern Valley Indian Community
P.O. Box 1010
Lake Isabella, CA 93240

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Ms. Turner:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

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The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

A cultural resources records search for the proposed project was conducted through the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) on May 5, 2020. A total of five prehistoric or multicomponent resources have been recorded within the Phase I Project Area (four prehistoric isolates and one multicomponent archaeological site). No prehistoric resources have been recorded within the Phase II Project Area. A total of 38 prehistoric or multicomponent resources have been recorded within the Kern Fan Conveyance Facilities Area (29 prehistoric archaeological sites, two multicomponent archaeological sites, and seven prehistoric isolates).

A search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was conducted on May 6, 2020. The results were negative, indicating that the NAHC does not have any sacred sites or Native American cultural resources on file within the proposed project areas (Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area).

In an effort to address any potential impacts to archaeological or Native American resources, we are seeking comments and information from Native American representatives, and your name was supplied to us by the NAHC as a contact for this area. We would appreciate your comments identifying any sensitive sites in or near the proposed project areas that you may be aware of, any concerns or issues pertinent to the proposed project.

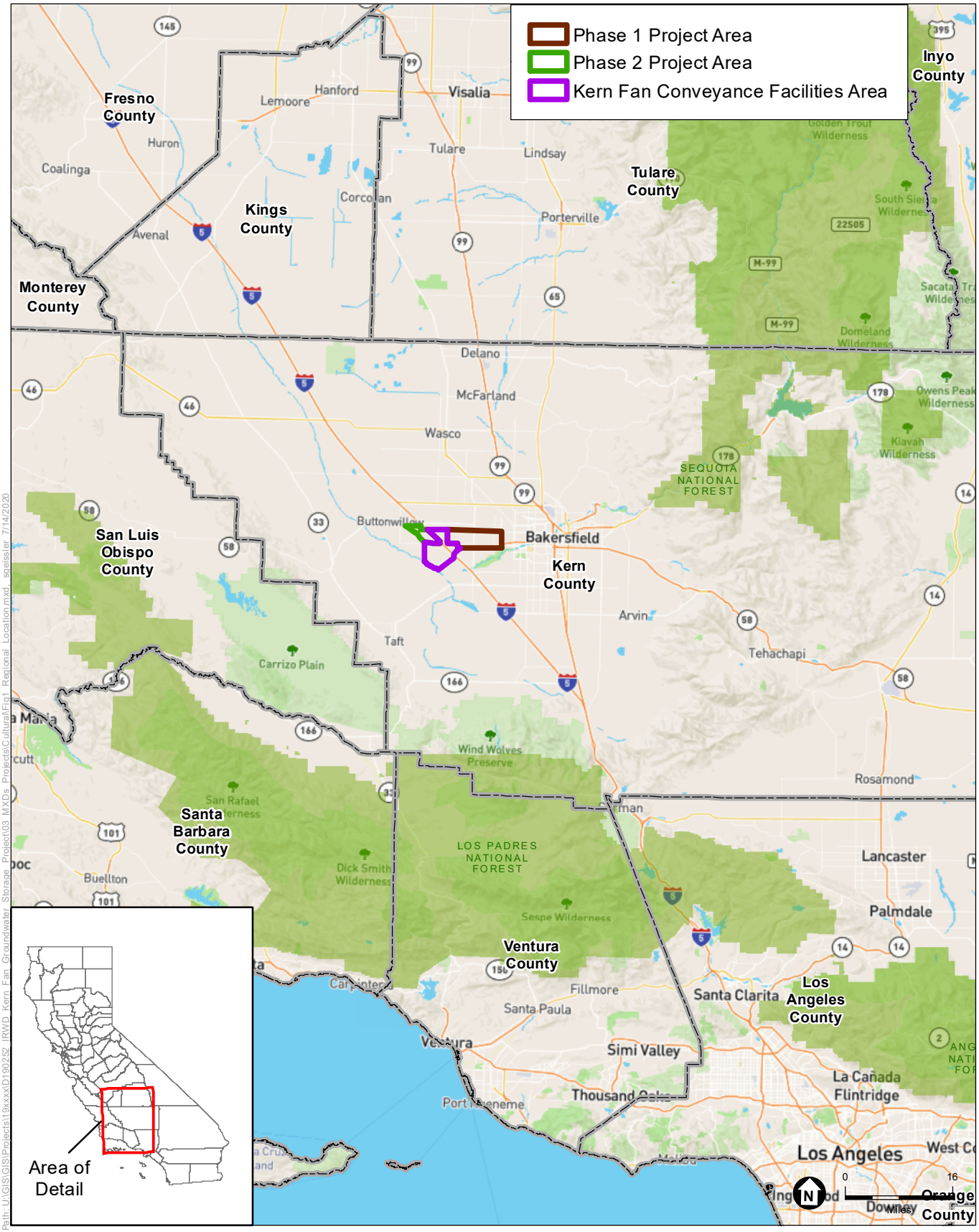
If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

Sincerely,

Candace Ehringer

Candace Ehringer
Cultural Resources Program Manager

Enclosures: Figure 1 – Regional Location
Figure 2 – Project Location
Figure 3 – Project Detail

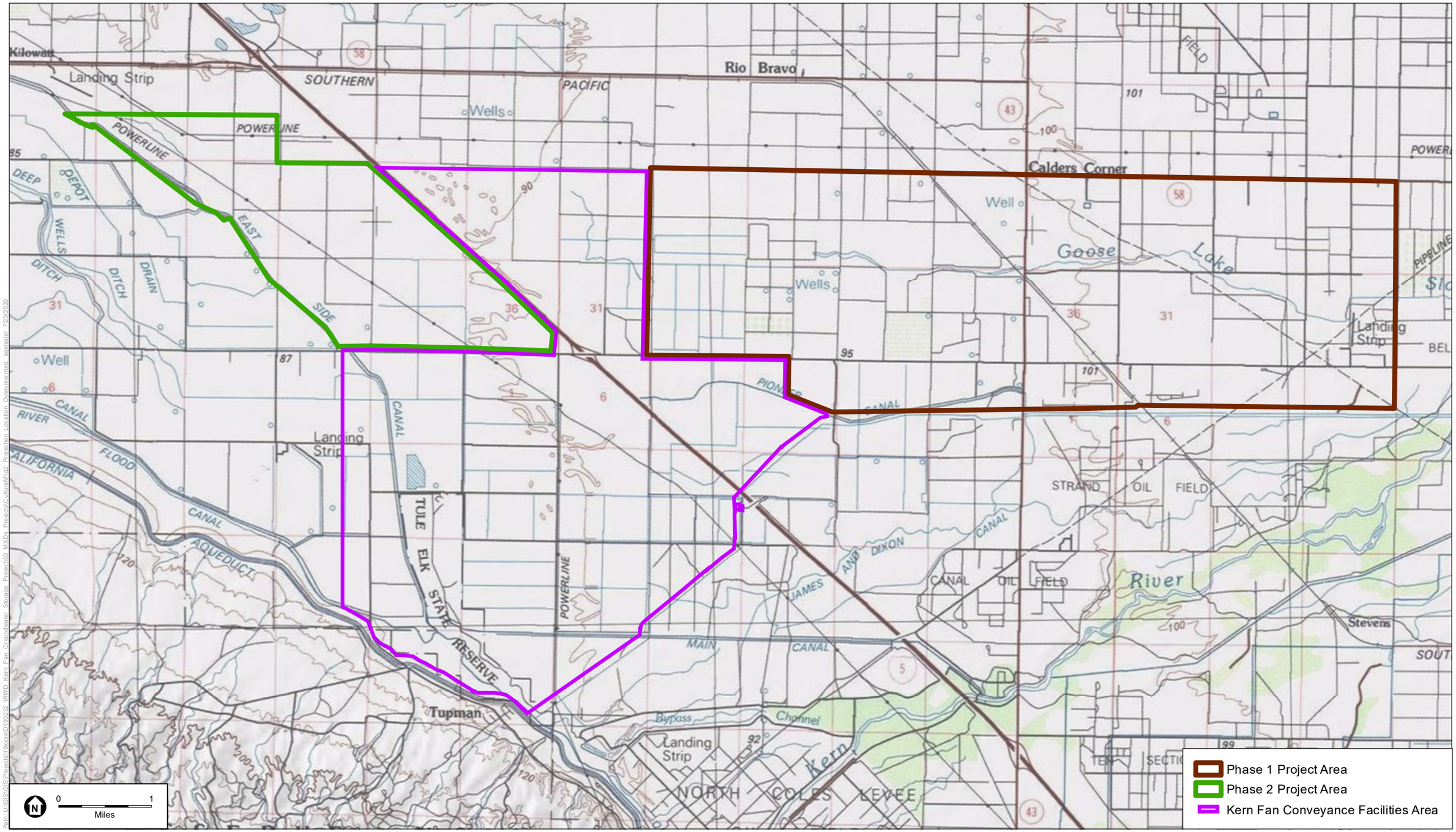


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



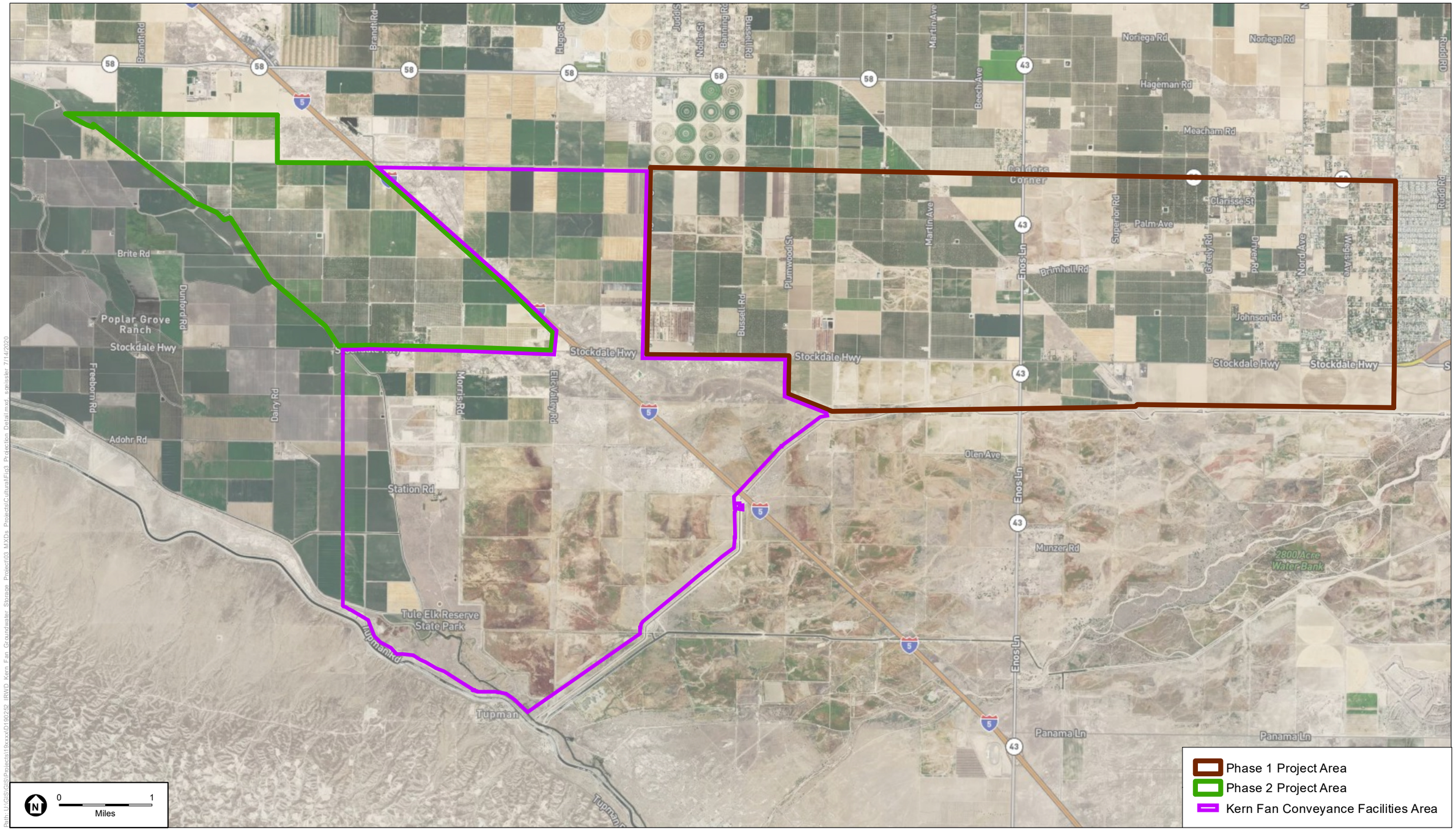
Path: U:\GIS\GIS\Projects\19xxxx\D190252 IRWD Kern Fan Groundwater Storage Project\03 MXDs Projects\Cultural\Fig2 Projection Location Overview.mxd, saeissler 7/20/2020

SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

July 23, 2020

Kenneth Woodrow, Chairperson
Wuksache Indian Tribe/Eshom Valley Band
1179 Rock Haven Ct.
Salinas, CA 93906

Subject: Proposed Kern Fan Groundwater Storage Project, Kern County, California

Dear Chairperson Woodrow:

Environmental Science Associates (ESA) has been retained by the Rosedale-Rio Bravo Water Storage District (Rosedale) and Irvine Ranch Water District (IRWD) to prepare an Environmental Impact Report (EIR)for the Kern Fan Groundwater Storage Project (proposed project) located in western Kern County and west of the City of Bakersfield. The proposed project would be carried out jointly by Rosedale and IRWD through the Groundwater Banking Joint Powers Authority.

The proposed project would allow Rosedale and IRWD to more effectively manage existing sources of water supply by using available underground storage in the local San Joaquin Valley Groundwater Basin. To do that, Rosedale and IRWD would develop water recharge and recovery facilities in the Kern Fan area of Kern County. The proposed project would recharge, store, recover and deliver State Water Project (SWP) water, including Article 21 water, and water from other sources when available. The stored water would be used to provide ecosystem benefits downstream from the SWP's Lake Oroville and supply reliability benefits for agricultural, and municipal and industrial uses.

The proposed project would consist of construction of up to 1,300 acres of recharge basin facilities and approximately 12 recovery wells. In addition, the Kern Fan Conveyance Facilities would consist of pipelines, pump stations and a new turnout at the California Aqueduct to convey water between the recharge and recovery facilities and the California Aqueduct. The proposed project would be implemented in two phases; each phase would construct up to approximately 640 acres of recharge and recovery facilities within the project area. Water could be conveyed to and from the Phase 1 and 2 properties through existing facilities and the proposed Kern Fan Conveyance Facilities connecting to the California Aqueduct. The proposed project would be located in western Kern County, west of the City of Bakersfield. Project facilities have yet to be sited, but would be located within the areas shown on the attached maps (Figures 1 through 3). There are three areas identified: Phase I Project Area, Phase II Project Area, and Kern Fan Conveyance Facilities Area.

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In an effort to address any potential impacts to archaeological or Native American resources, we are seeking comments and information from Native American representatives, and your name was supplied to us by the NAHC as a contact for this area. We would appreciate your comments identifying any sensitive sites in or near the proposed project areas that you may be aware of, any concerns or issues pertinent to the proposed project.

If you have any questions or comments, please contact me by phone at (831) 737-7438 or by email at cehringer@esassoc.com. We kindly request a response to this letter by July 24, 2020 to ensure that any concerns are adequately addressed in the EIR. Thank you for your cooperation on this matter.

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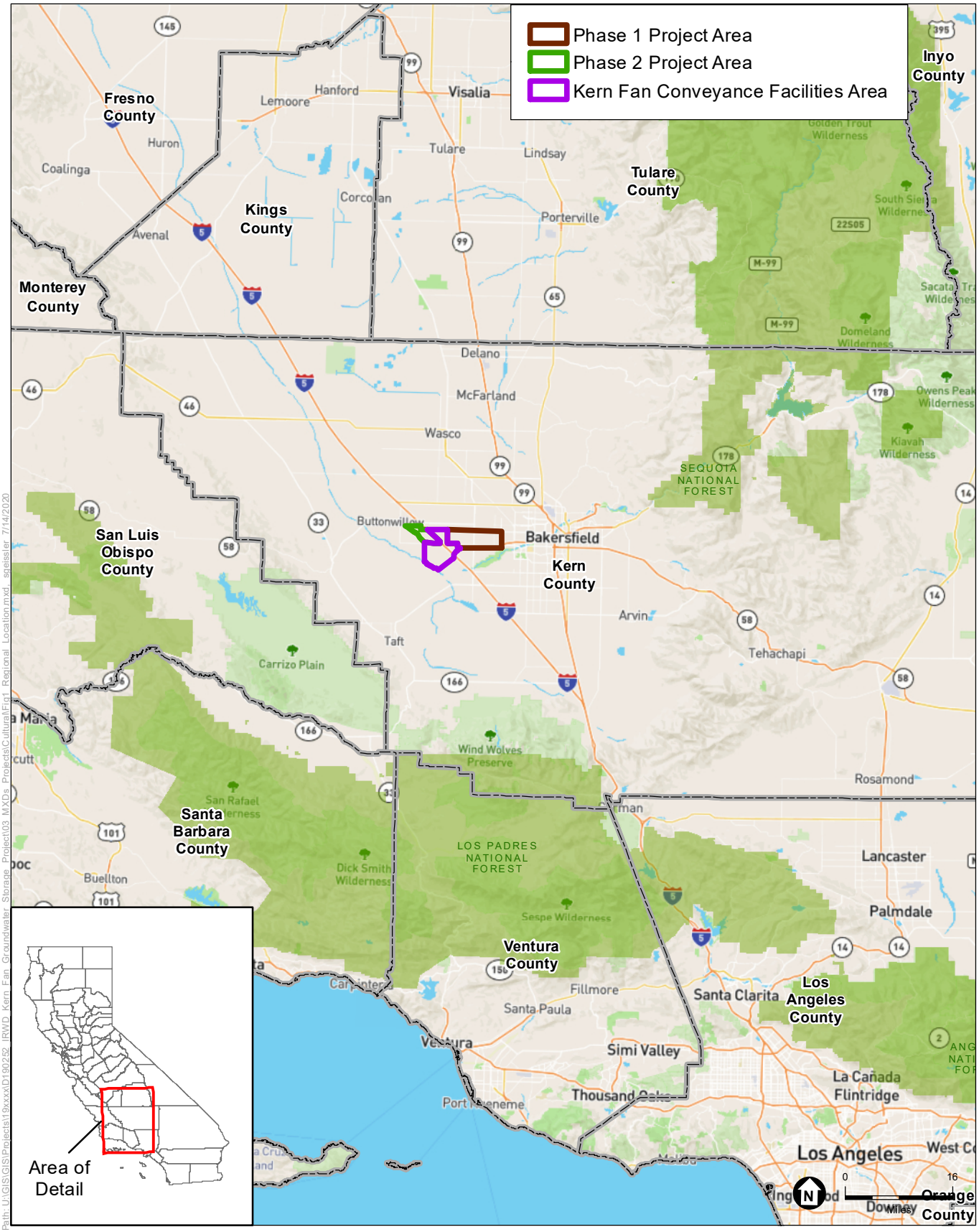
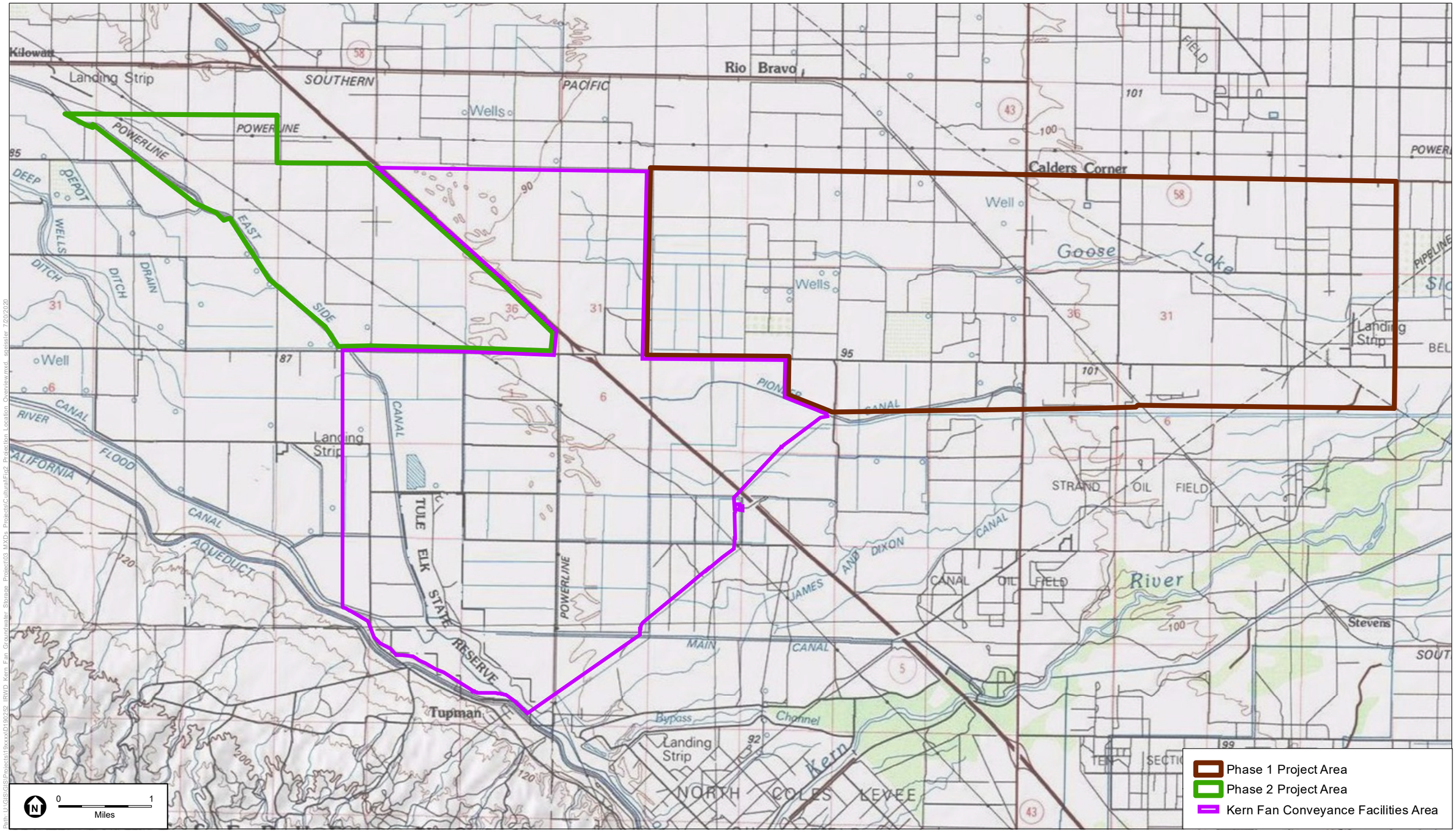


SOURCE: ESRI.

Kern Fan Groundwater Storage Project

Figure 1
Regional Location

ESA



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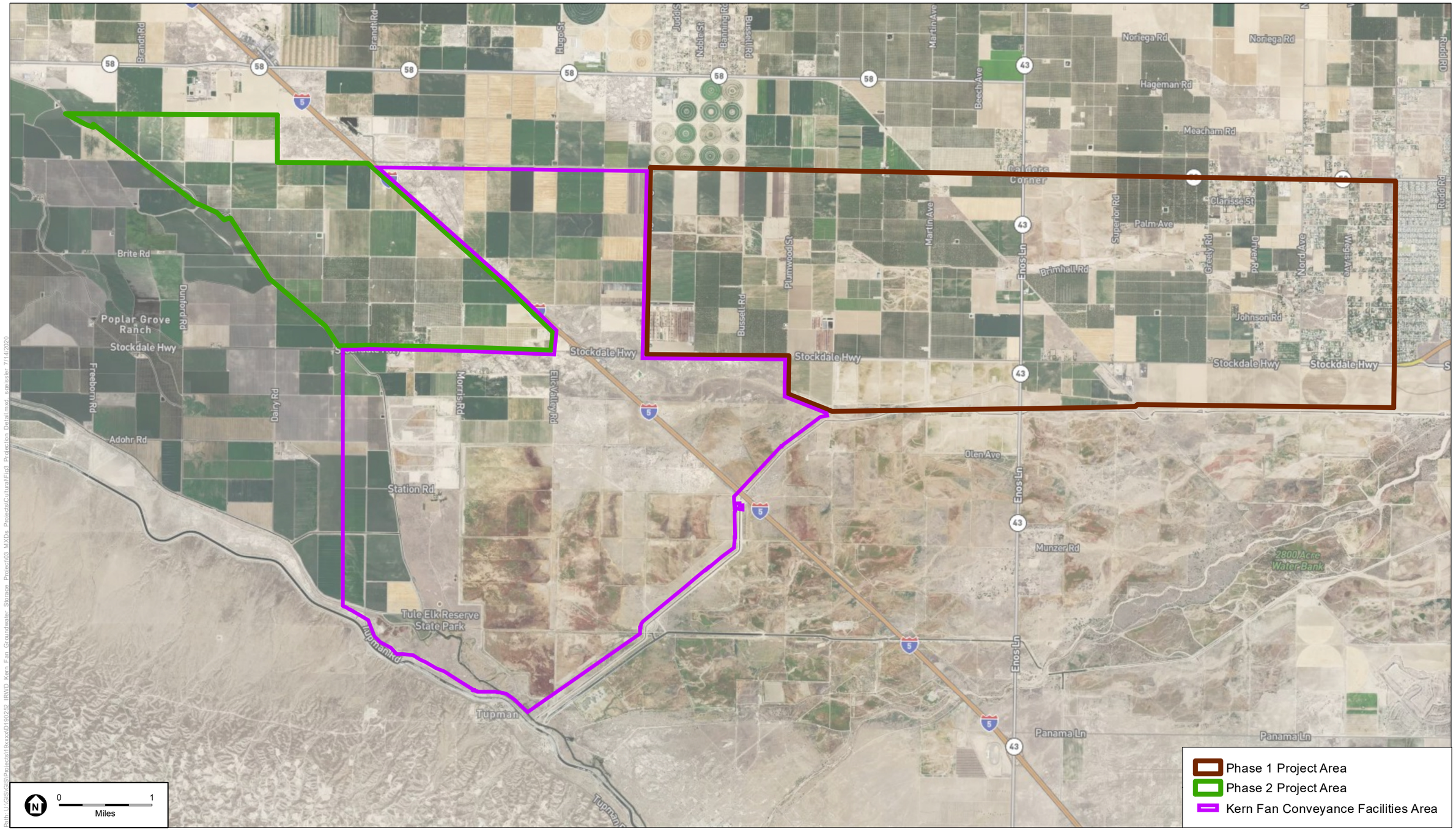
SOURCE: USGS Topographic Series (Buttonwillow, East Elk Hills, Rio Bravo, Rosedale, Stevens, Tupman, CA).

Kern Fan Groundwater Storage Project

Figure 2
Project Location – Overview

ESA



SOURCE: Mapbox, 2020.

Kern Fan Groundwater Storage Project

Figure 3
Project Detail

ESA

Appendix H
Hydrogeological Analysis

ESA

Technical Memorandum

To:	Mr. Eric Averett Rosedale-Rio Bravo Water Storage District
From:	Thomas Harder, P.G., CH.G. Thomas Harder & Co.
Date:	12-Oct-20
Re:	Kern Fan Groundwater Storage Project – Hydrogeological Analysis

1. Introduction

This Technical Memorandum (TM) summarizes an analysis of potential groundwater level changes from proposed artificial recharge and recovery operations at the Kern Fan Groundwater Storage Project (the Project). The proposed Project includes facilities in three different areas within the western part of Rosedale-Rio Bravo Water Storage District's (RRBWSD's) service area: an eastern property in Section 29S/25E-33, a central property in sections 29S/24E-36 and 29S/25E-31, and a western property in sections 29S/24E-26, 27, 28 and 34 (see Figures 1 and 2). Facilities in each area include both spreading basins and recovery wells. The Project will be operated by the RRBWSD in cooperation with the Irvine Ranch Water District (IRWD).

This TM presents the results of a hydrogeological analysis to assess potential groundwater level impacts associated with managed recharge and groundwater recovery associated with the Project. The analysis was conducted using a calibrated numerical groundwater flow model previously developed to assess groundwater level changes in the area of banking projects along the lower Kern River.

1.1. Purpose and Scope

The purpose of the analysis presented herein is to:

1. Identify conceptual locations for recharge basins within the properties identified for the Project.
2. Estimate the annual recharge capacity of the proposed recharge facilities.

3. Identify the location of extraction wells for the Project.
4. Evaluate potential changes in groundwater levels associated with recharge and recovery at the facilities.

The scope of work to address the objectives included:

1. Compiling and reviewing hydrogeological data for the immediate Project area.
2. Developing estimates of recharge capacity at the recharge basins.
3. Identifying the location and conceptual construction of new wells for use in analysis of groundwater level impacts.
4. Developing recharge and recovery scenarios for analysis.
5. Analyzing the scenarios using a calibrated groundwater flow model.
6. Evaluating potential groundwater level changes from model results.
7. Preparing this TM describing the analysis and summarizing the results.

1.2. Conceptual Project Description

The Project includes both recharge basins and extraction wells distributed within three properties in the western part of RRBWSD's service area as shown on Figure 2. The area for recharge basins is 1,200 acres of the properties. Groundwater recovery will be accomplished from 12 planned recovery wells. Water will be conveyed to the recharge basins and from the recovery wells via pipelines as shown Figure 2.

1.3. Analysis Methodology

Potential changes in groundwater levels predicted for Project recovery scenarios were analyzed using a calibrated numerical groundwater flow model. The groundwater model used for the analysis was previously developed to evaluate groundwater level changes in the vicinity of banking projects along the Kern River west of Bakersfield, California. The model was developed using MODFLOW, a block centered, finite difference groundwater flow modeling code developed by the United States Geological Survey (USGS) for simulating groundwater flow (McDonald and Harbaugh, 1988).[1] MODFLOW is one of the most widely used and critically accepted model codes available (Anderson and Woessner, 2002).[2]

[1] McDonald, M.G., and Harbaugh, A.W., 1988. A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model: in Techniques of Water-Resources Investigations of the United States Geological Survey; Book 6 Modeling Techniques.
[2] Anderson, M.P., and Woessner, W.W., 2002. Applied Groundwater Modeling, Simulation of Flow and Advective Transport. Academic Press.

The original documentation for the model is presented in TH&Co (2011).[3] Since that time, the model has been updated, refined, and recalibrated. The version used for this analysis is calibrated through December 2018.

1.4. Types and Sources of Data

The calibrated groundwater flow model used in the analysis of groundwater level changes incorporates a comprehensive hydrogeological database of the Project Area, as summarized in TH&Co (2011).[3] The types of data used to develop the model included geology, soils/lithology, groundwater levels, hydrogeology, surface water hydrology, and groundwater recharge and pumping. Information regarding the Project areas was provided by RRBWSD. Future pipeline alignments were informed from Dee Jaspar (2020).[4]

[3] TH&Co., 2011. Hydrogeological Impact Evaluation Related to Operation of the Kern Water Bank and Pioneer Projects. Prepared for McMurtrey, Hartsock, & Worth and Rosedale-Rio Bravo Water Storage District, December 5, 2011.
[4] Dee Jaspar & Associates, 2020. Kern Fan Groundwater Storage Project – 30% Design Report. Prepared for Rosedale-Rio Bravo Water Storage District and Irvine Ranch Water District. Dated March 27, 2020.

2. Project Operational Parameters

2.1. Criteria for Identifying Recharge Basin Locations

The locations for recharge basins within the larger properties were identified to coincide with areas where available data indicates high infiltration potential and to minimize distance from the proposed distribution pipeline alignment (see Figure 3). Infiltration potential was assessed through the University of California at Davis' Soil Agricultural Groundwater Banking Index (SAGBI) that identifies favorable areas of recharge based on deep percolation potential, root zone residence time, topography, chemical limitations, and soil surface condition. The SAGBI zones for the Project area are shown on Figure 3. Recharge basins were sited to coincide with infiltration zones identified as "Excellent," "Good" or "Moderately Good" where possible. Infiltration potential in some of the recharge basin area in the western property is identified as "Moderately Poor," which could not be avoided to balance recharge potential with proximity to the proposed distribution pipeline.

2.2. Estimates of Maximum Annual Recharge Capacity

For this analysis, annual recharge capacity is defined as the maximum volume of water that the Project can infiltrate into the subsurface in a year. The recharge capacity was estimated based on the size of the facility (wetted area), the time available to accept water (assumed to be 10 months), and the infiltration rate. The wetted area is estimated to be 960 acres for the full project, which is 80 percent of the planned recharge basin area (1,200 acres) as provided by RRBWSD. The reduced wetted area accounts for berms, well pads, and other areas that will not be wetted and is consistent with other recharge projects in the vicinity.

Potential infiltration rates in the recharge basins were assigned based on infiltration rates measured in nearby existing recharge basins. The eastern and central basins were assigned an infiltration rate of 0.5 ft/day based on measured infiltration rates in RRBWSD's Mayer ponds. The infiltration rate for the western basins were assigned a value of 0.3 ft/day, which is consistent with infiltration rates previously measured in some of the northern Kern Water Bank basins.

Using the assumed infiltration rates and the wetted area for the Project, as described above, the resulting annual recharge capacity for the full project is approximately 117,400 acre-ft/yr (see Table 1).

2.3. Individual Well Pumping Rates

The potential pumping rate for individual Project wells was determined based on pumping rates for existing wells in the Project area. Individual well production rates in the Project area typically range from approximately 1,600 gallons per minute (gpm) to approximately 5,000 gpm. However,

wells with both intermediate and deep perforated intervals (250 to 700 feet below ground surface; ft bgs) typically produce more than 3,000 gpm. For analysis purposes, it is assumed that each well will be perforated in both the intermediate and deep aquifer systems. Pumping rates were assigned to the 12 Project wells to enable recovery of 50,000 acre-ft in the first year of a two-year recovery cycle and 40,000 acre-ft in the second year (see Table 2). Assuming a 10-month recovery year, maximum simulated individual well pumping rates used for the groundwater level analysis were 3,090 gpm/well during the first recovery year and 2,473 gpm/well during the second recovery year.

3. Project Operational Scenarios for Analysis Using the Groundwater Flow Model

The Kern Fan Groundwater Storage Project is located in the western part of RRBWSD's service area. Existing recharge and recovery operations are already occurring to the south (Kern Water Bank) and east of the Project area (RRBWSD Drought Relief Project). In addition, there is ongoing groundwater production in the area to supply agriculture and municipal demands. For this analysis, monthly artificial recharge and groundwater production for the Project was superimposed on a portion of the historical groundwater record that represents a potential range of groundwater level conditions that could be expected in the future. Significant changes in groundwater levels have occurred during the various recharge and recovery cycles in the Project area since 1995 when the Kern Water Bank began operations (see Figure 4). In the past 10 years, groundwater levels have fluctuated as much as 50 ft between 2013 (high groundwater condition) and 2016 (low groundwater condition). For Model simulations, this period of extreme groundwater level fluctuations was selected as the baseline conditions upon which to superimpose Project recharge and recovery in order to simulate the greatest potential cumulative groundwater level impact at existing wells, the Eastside Canal and the Cross Valley Canal (CVC).

3.1. Baseline Groundwater Level Conditions

The baseline condition for this analysis is the historical groundwater condition for the calibrated groundwater flow model. This baseline condition includes all historical hydrological conditions, including recharge and recovery from other projects (e.g. KWB, Pioneer Project, Strand Ranch, etc.), which resulted in the calibrated groundwater levels in the model.

3.2. Project Operational Scenarios

Project-related groundwater recharge and pumping was superimposed on the Baseline condition in accordance with the Project scenarios summarized in Table 2. Project recharge was introduced into the model for the historical period from March 2012 through December 2012 to simulate high groundwater conditions (see Figure 4). The maximum capacity of the basins (combined total of 117,413 acre-ft) was recharged in the model during this period. Groundwater recovery was simulated over two 10-month periods overlapped on March 2015 through December 2015 and March 2016 through December 2016 groundwater level conditions. A total of 90,000 acre-ft of groundwater was recovered during this time (see Table 2).

4. Findings

4.1. Predicted Changes in Groundwater Levels During Maximum Recharge Mounding

During the recharge cycle (March 2012 through December 2012), as much as approximately 110 ft of groundwater mounding is simulated to occur in the shallow/intermediate aquifer in the central portion of the Project (see Figure 5). During maximum mounding, groundwater levels in the central basin are within approximately 64 ft of the land surface. Maximum Project mounding in the deep aquifer is approximately 45 ft relative to baseline conditions (see Figure 6). Maximum mounding in the deep aquifer is spread out beneath the western and central basins.

4.2. Predicted Changes in Groundwater Levels During Recovery

Maximum groundwater level decline from Project recovery, relative to the baseline condition, is predicted to occur primarily in the western Project area where most of the Project extraction wells are located. Maximum drawdown at the Project pumping wells is predicted to be on the order of approximately 30 ft in the shallow/intermediate aquifer (see Figure 7) and approximately 28 ft in the deep aquifer (see Figure 8). Maximum pumping interference at the nearest existing project and private wells is predicted to be approximately 22 ft and occur in the deep aquifer in the western portion of the Project area (see Figure 8).

4.3. Cumulative Changes in Groundwater Levels During Recovery

In addition to evaluating the Project impact on groundwater levels for existing private wells and other banking project wells based on historical operations, TH&Co evaluated the cumulative pumping drawdown predicted for nearby private and project wells that could result when the nearby Drought Relief Project (DRP) and Stockdale Integrated Project are operating at full capacity in the future. Groundwater level impacts from the DRP and Stockdale Integrated Projects were reported in TH&Co (2015).[5] The drawdown from these projects and the drawdown from the Kern Fan Groundwater Storage Project are additive in accordance with the principle of superposition. Thus, the sum of the drawdowns from each individual project at any given point is the total drawdown that can be expected at that point. Based on this, the maximum cumulative pumping interference from all projects occurs at 29S/24E-28A61 where cumulative drawdown is predicted to be approximately 20 ft in the shallow/intermediate aquifer (see Figure 9) and 22 ft in the deep aquifer (see Figure 10). At the existing DRP project well WB-1, the maximum total pumping interference from all projects is approximately 53 ft (see Figure 10). The predicted

[5] TH&Co, 2015. 2014 Drought Relief Project – Supplemental Analysis. Model Analysis Figures Submitted on June 19, 2015.

maximum cumulative pumping interference at the nearest other banking project well (WKWD NW 1) is 16 feet (see Figure 10). Predicted cumulative interference at the nearest Kern Water Bank well (30S/25E-06K01) is 20.5 ft.

4.4. Predicted Project Groundwater Levels Relative to Sustainable Management Criteria

TH&Co compared the projected groundwater levels during simulated Project recovery under historical low groundwater conditions to the Minimum Thresholds established for the Rosedale-Rio Bravo Management Area (RRBMA) in the Kern Groundwater Authority Groundwater Sustainability Plan (GSP) established under the 2014 Sustainable Groundwater Management Act (SGMA). The deepest projected groundwater levels for the Intermediate Aquifer at designated RRBMA monitoring wells are shown on Figure 11 and the deepest projected groundwater levels for the Deep Aquifer at the same wells are shown on Figure 12. As shown on Figure 11, the deepest simulated Project groundwater levels in the Intermediate Aquifer are not projected to exceed the Minimum Thresholds at RRBMA monitoring wells (see Attachment A) although groundwater levels immediately west of the western basins and in between the central and eastern basins approach the Minimum Thresholds. Projected Project groundwater levels in the Deep Aquifer during maximum pumping drawdown slightly exceed the Minimum Threshold at the westernmost RRBMA monitoring well and are at the Minimum Threshold at the monitoring well between the central and eastern Project basins (see Figure 12).

5. Conclusions

The following summarizes the findings that have been developed based on the analysis of Project recharge and recovery scenarios:

1. Based on infiltration rates estimated from recharge operational data at the adjacent banking facilities, the maximum estimated recharge capacity of Project facilities is approximately 117,400 acre-ft/yr.
2. Groundwater levels predicted for maximum mounding conditions are not anticipated to rise to levels that would damage existing canals or cause a liquefaction hazard. In general, maintaining groundwater levels below 50 ft bgs will be protective of liquefaction during an earthquake.[6] Further geotechnical studies in the Kern Water Bank area have shown that groundwater levels below 15 ft bgs are protective of liquefaction.[7] Model simulations for this Project show that groundwater levels remain below approximately 64 ft bgs during maximum mounding.
3. Project groundwater pumping is predicted to result in up to 22 ft of additional drawdown at the nearest existing private well. This drawdown is cumulative with anticipated DRP and Stockdale Integrated Banking project pumping.
4. Project groundwater pumping is predicted to result in up to ten feet of additional drawdown at the nearest banking project well (WKWD NW-1) and a cumulative of up to 16 feet of drawdown at this well when the DRP and Stockdale Integrated Banking project are taken into account.
5. Project groundwater pumping is predicted to result in up to six feet of additional drawdown at the nearest Kern Water Bank well (30S/25E-06K01) and a cumulative of up to approximately 21 ft of drawdown at this well when the DRP and Stockdale projects are included.
6. Project groundwater pumping is predicted to lower groundwater levels in the Deep Aquifer to the established Minimum Thresholds at the RRBMA monitoring well immediately west of the western Project recharge basin and the RRBMA monitoring well in between the central and eastern Project recharge basin. Criteria to establish these Minimum Thresholds were based, in part, on the potential to produce groundwater with elevated arsenic concentrations when the groundwater level was drawn below them. In order to avoid the undesirable result of producing groundwater level with arsenic concentrations above the Maximum Contaminant Level, Project management actions (e.g. limiting groundwater

[6] Martin, G.R., and Lew M., eds, 1999. Recommended Procedures for Implementation of DMG Special Publication 117: Guidelines for Analyzing and Mitigating Liquefaction Hazards in California. Southern California Earthquake Center – University of Southern California.

[7] Krazen & Associates, 2013. *Soil Liquefaction Evaluation for the Proposed McAllister Ranch Irrgation District – James Project, Panama Lane, Kern County, California*. Dated March 13, 2012.

pumping or wellhead treatment) may be necessary when groundwater levels are at the Minimum Thresholds.

Table 1

Kern Fan Groundwater Storage Project
Annual Recharge Capacity Estimates

	Basin			
	West Basin	Central Basin	East Basin	Total
Total Basin Size (acres)[1]	475	386	98	960
Estimated Infiltration Rate (ft/day)	0.3	0.5	0.5	NA
Monthly Infiltration Capacity (acre-ft/month)[2]	4,348	5,893	1,501	11,741
Annual Infiltration Capacity (acre-ft/yr)	43,481	58,926	15,006	117,413

Notes:

[1]Estimated as 80% of the property.

[2]acre-ft = acre-feet.

NA = Not applicable.

Table 2

Kern Fan Groundwater Storage Project
Summary of Operational Scenario

Facility	Recharge			Recovery		
	Amount Recharged (acre-ft)[1]	Total Recharged (acre-ft/yr)	Simulated Period of Recharge	Total Recovered (acre-ft/yr)[2]	Total Recovered (acre-ft)	Period of Recovery
West Basin	43,481	117,413	Mar 2012 - Dec 2012	50,000, 40,000	90,000	Mar 2015 - Dec 2015, Mar 2016 - Dec 2016
Central Basin	58,926					
East Basin	15,006					

Notes:

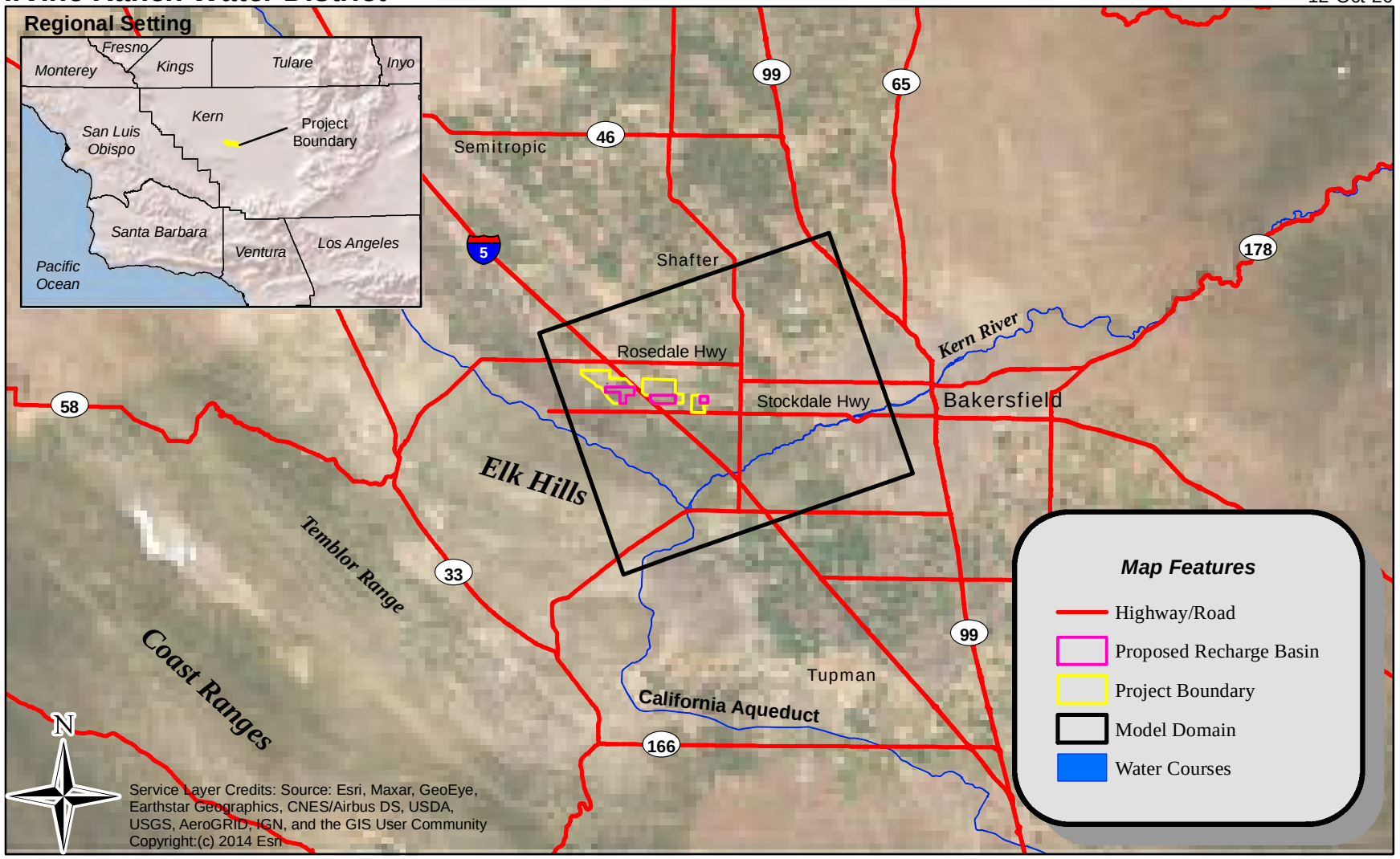
[1] Assumes 80% of the total property.

[2] Assumes 70% utility.

Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

Kern Fan Groundwater Storage Project

12-Oct-20



0 3.75 7.5 15 Miles

NAD 83 Stateplane Zone 5

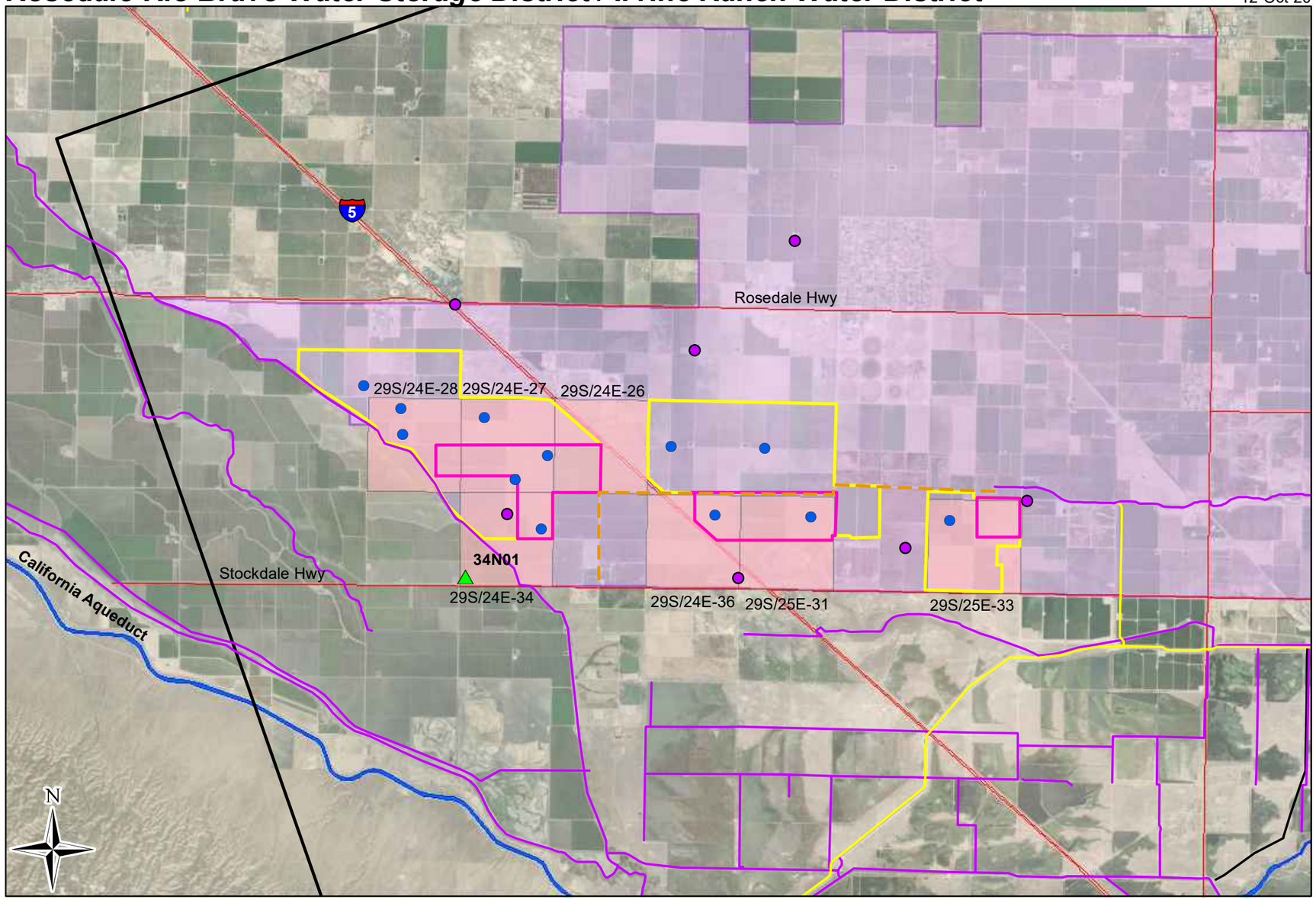
Thomas Harder & Co.
Groundwater Consulting

Study Area

Figure 1

Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

12-Oct-20



NAD 83 Stateplane Zone 5

Kern Fan Groundwater Storage Project

Map Features

- Proposed Extraction Well
- Observation Well (see Figure 4)
- SGMA Water Level Well
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Unlined Canal
- Lined Canal
- Pipeline
- Highway/Road
- Sections
- Proposed Recharge Basin
- Project Boundary
- Model Domain
- Water Courses

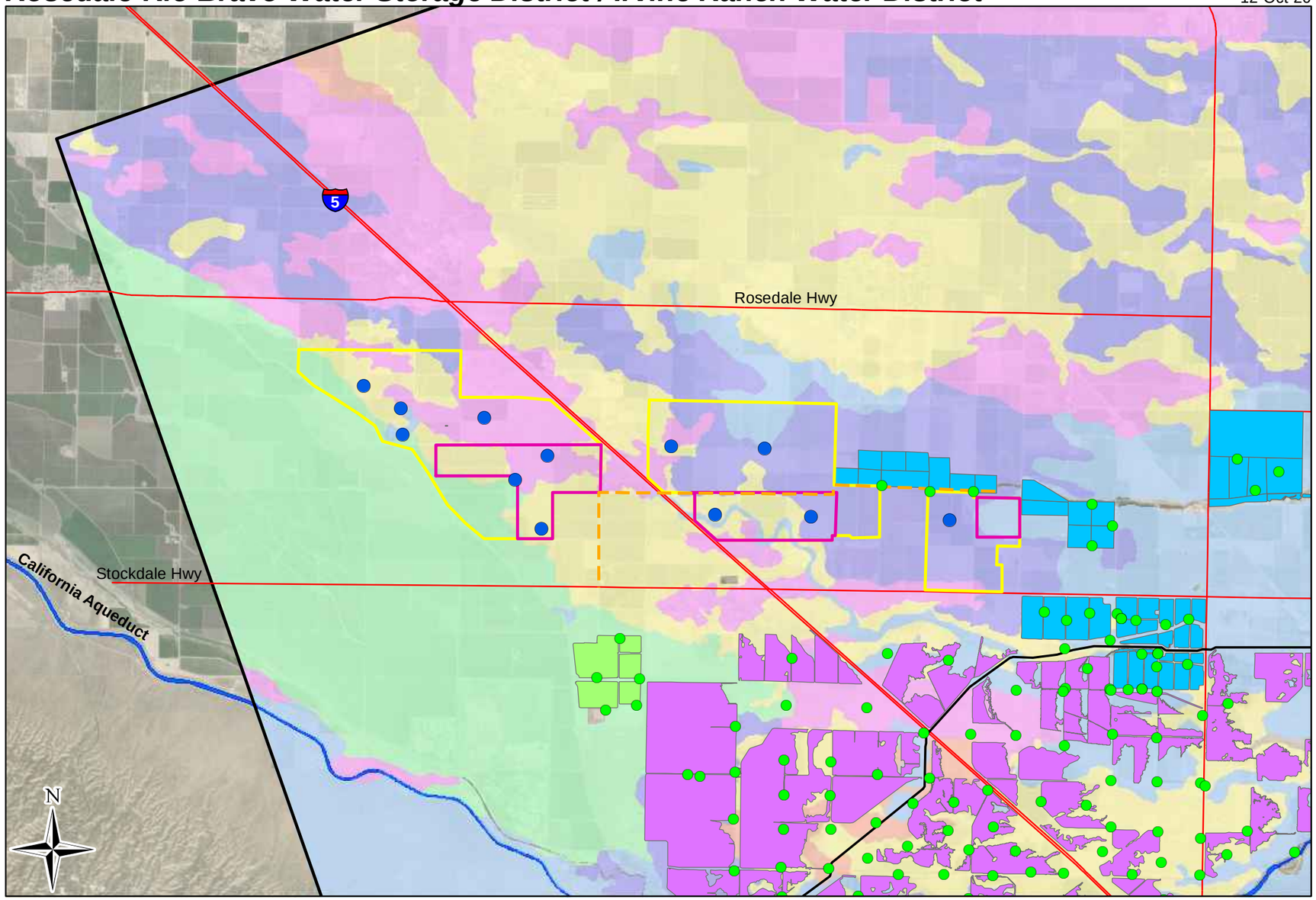
Thomas Harder & Co.
Groundwater Consulting

Proposed Project Facilities

Figure 2

Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

12-Oct-20



NAD 83 Stateplane Zone 5

Source: SAGBI | Soil Agricultural Groundwater Banking Index interactive map.
https://casoilresource.lawr.ucdavis.edu/sagbi/

Thomas Harder & Co.
Groundwater Consulting

Kern Fan Groundwater Storage Project

Map Features

- Existing Project Well
- Proposed Extraction Well
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)

SAGBI Index

- Excellent
- Good
- Moderately Good
- Moderately Poor
- Poor
- Very Poor
- Proposed Recharge Basin
- Project Property
- Kern Water Bank Recharge Basin
- RRBWSD Recharge Basin
- West Kern Water District Recharge Basin
- Model Domain
- Water Courses
- Highway/Road

The Soil Agricultural Groundwater Banking Index (SAGBI) is a suitability index for groundwater recharge on agricultural land. It is based on five factors: deep percolation, root zone residence time, topography, chemical limitations, and soil surface condition.

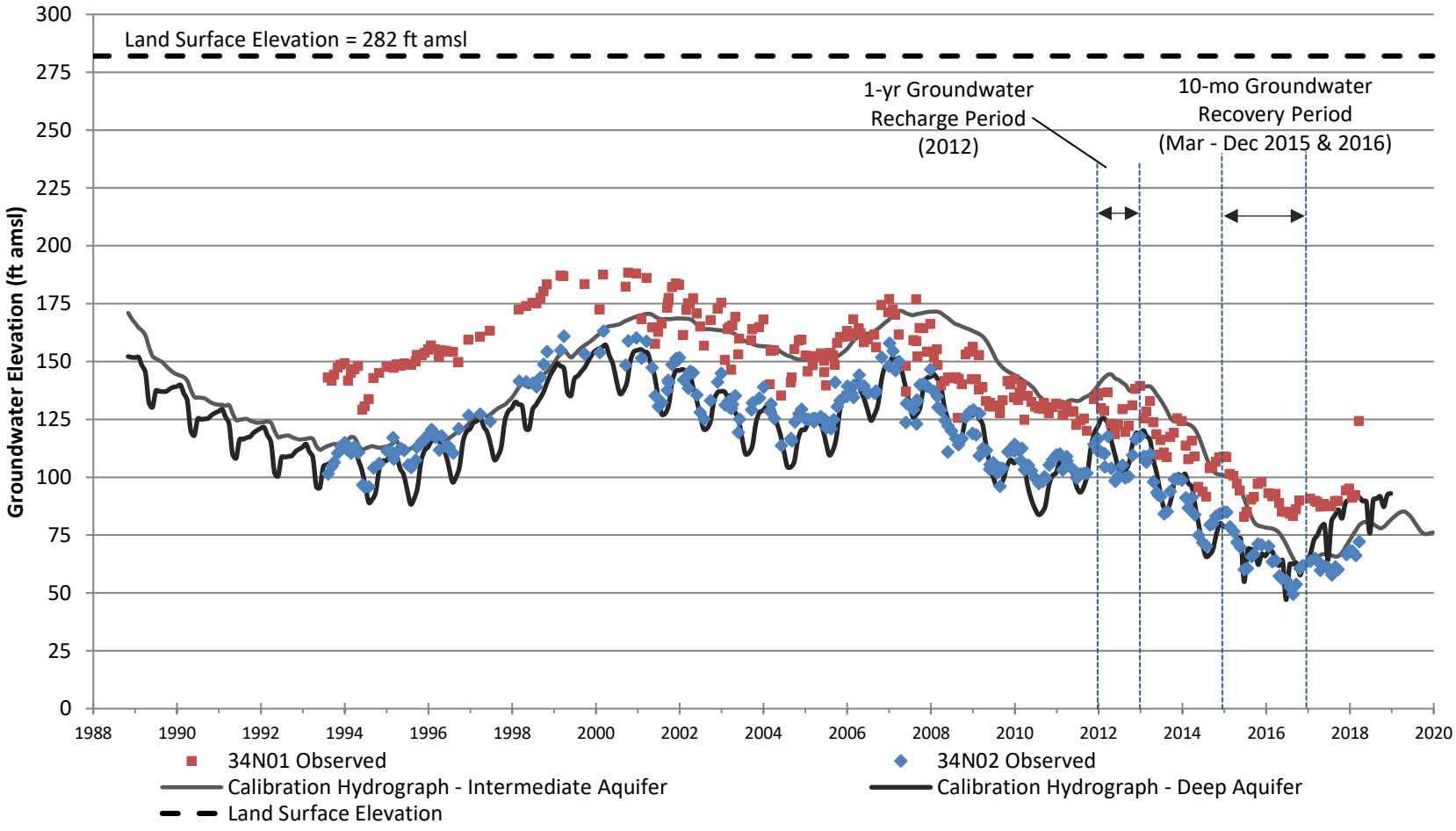
Recharge Basins and Favorable Areas for Recharge

Figure 3

Rosedale Rio-Bravo Water Storage District
Irvine Ranch Water District
Kern Fan Groundwater Banking Project

Figure 4

Hydrologic Conditions for Recharge and Recovery Periods
Baseline Hydrograph - 29S/24E-34N



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Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

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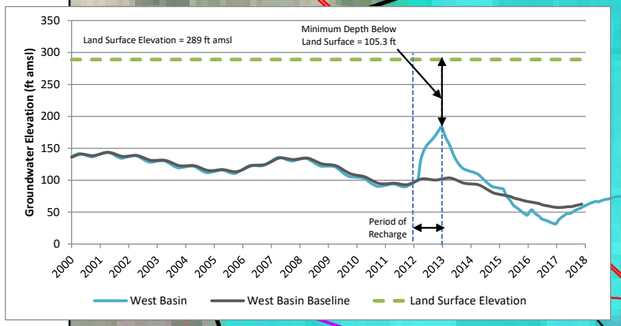

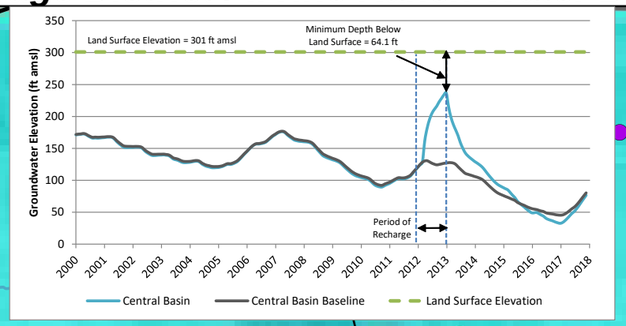

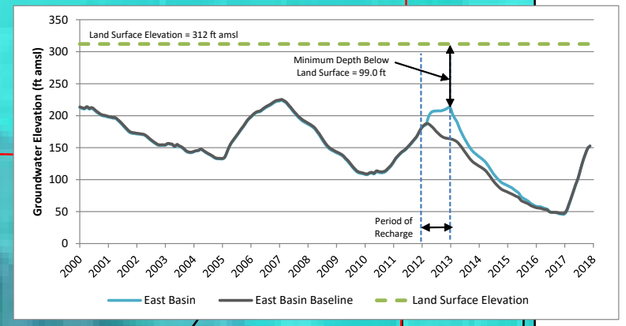

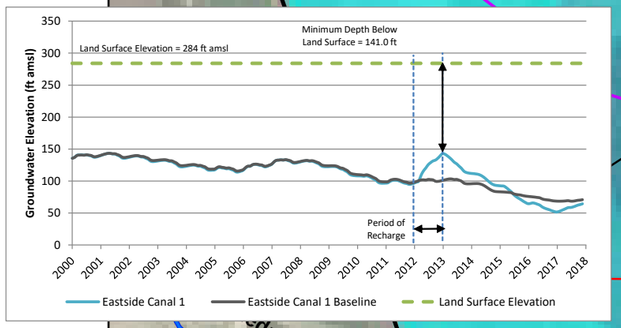

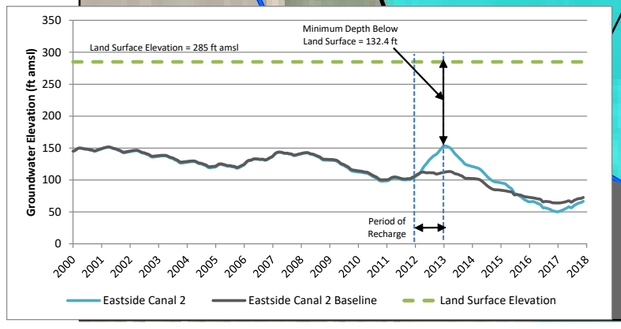

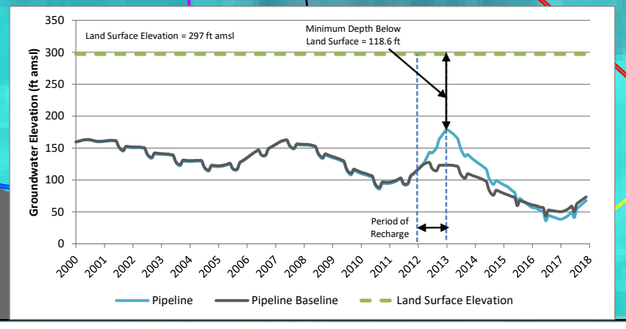

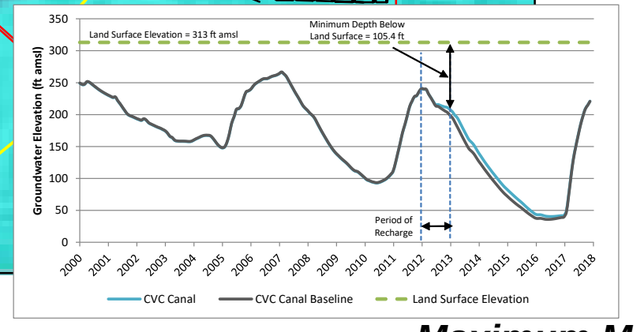

NAD 83 Stateplane Zone 5

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Kern Fan Groundwater Storage Project

Map Features

Maximum Groundwater Level Mounding (ft)

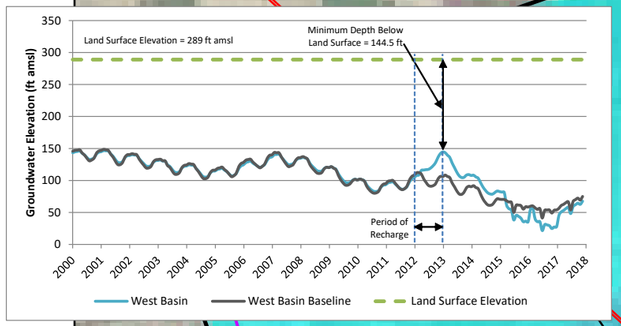
- >100
- 90 to 100
- 80 to 90
- 70 to 80
- 60 to 70
- 50 to 60
- 40 to 50
- 30 to 40
- 20 to 30
- 10 to 20
- 0 to 10
- SGMA RMS Well
- Modeled Observation Point
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Eastside Canal
- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Inactive
- Water Courses

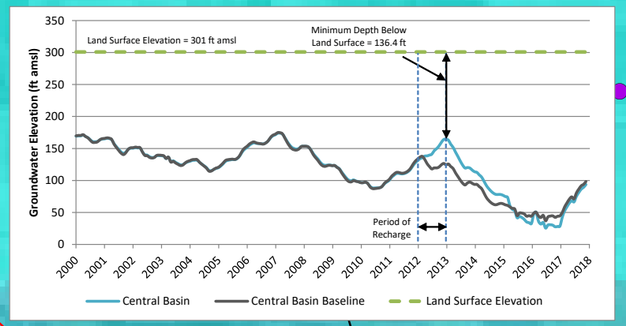
Intermediate Aquifer
Maximum Model-Predicted Groundwater Recharge Mounding - December 2012

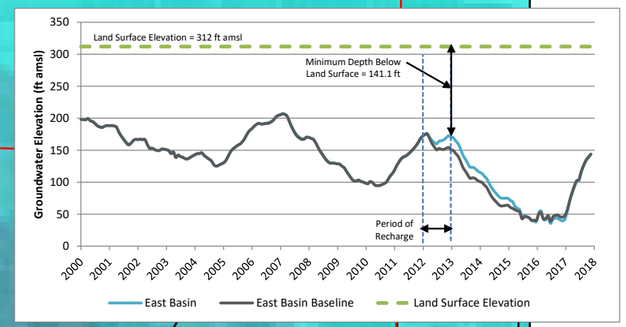
Figure 5

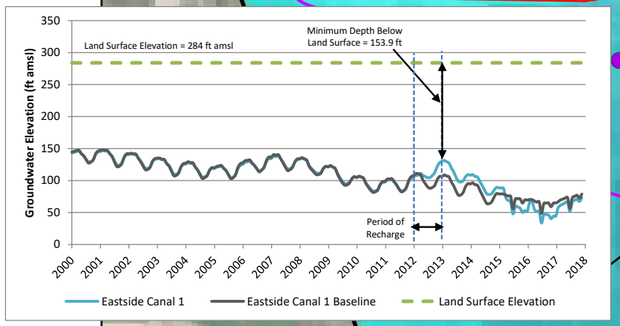
Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

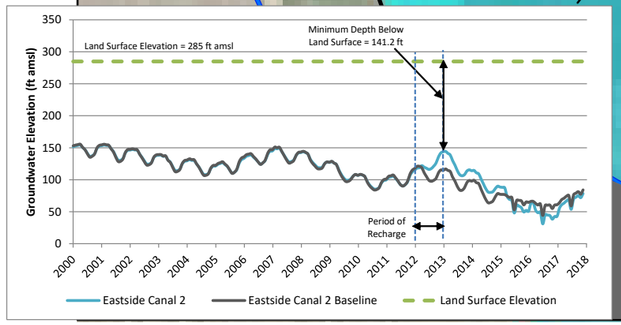
12-Oct-20

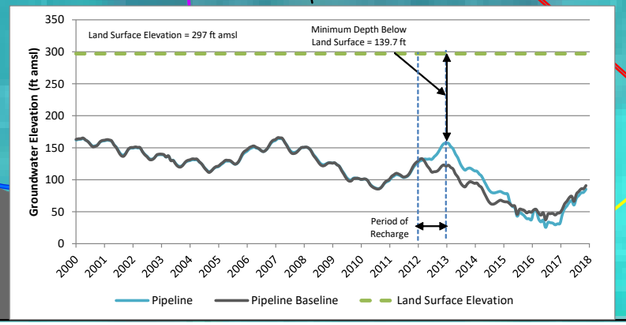


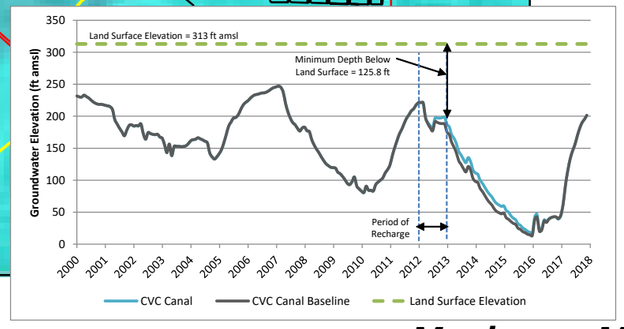












Rosedale Hwy

Stockdale Hwy

California Aqueduct

5

0 0.5 1 2 Miles

NAD 83 Stateplane Zone 5

Kern Fan Groundwater Storage Project

Map Features

Maximum Groundwater Level Mounding (ft)

- >100
- 90 to 100
- 80 to 90
- 70 to 80
- 60 to 70
- 50 to 60
- 40 to 50
- 30 to 40
- 20 to 30
- 10 to 20
- 0 to 10
- SGMA RMS Well
- Modeled Observation Point
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
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- RRBWSD Existing Recharge Basin
- Model Domain
- Inactive
- Water Courses

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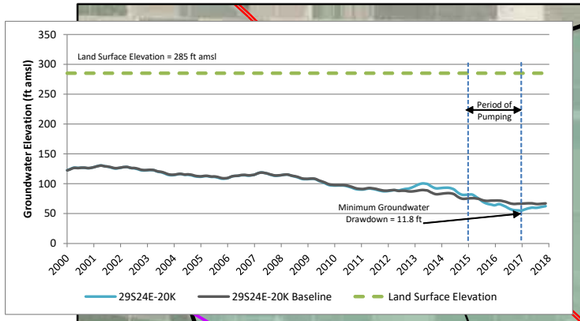
Deep Aquifer
Maximum Model-Predicted Groundwater Recharge Mounding - December 2012

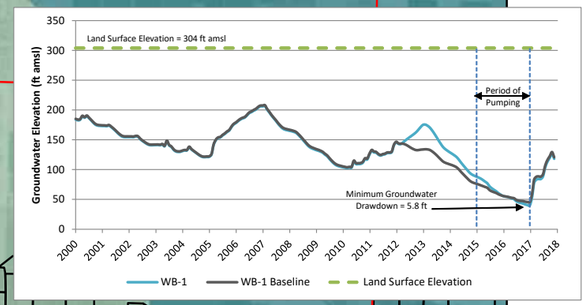
Figure 6

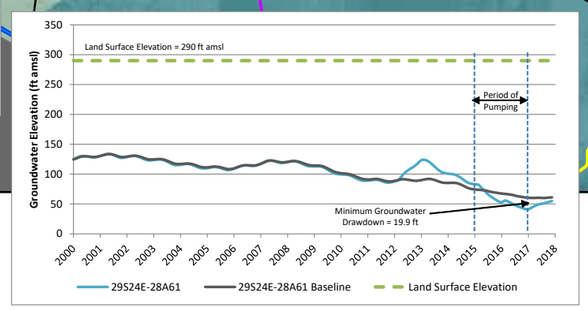
Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

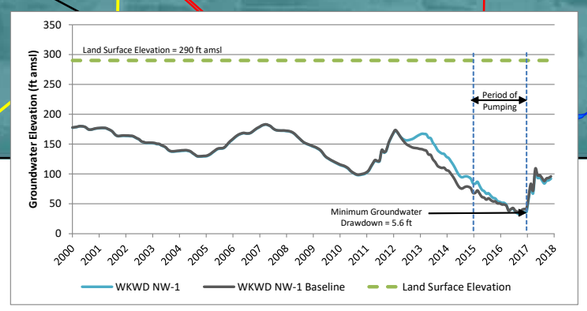
12-Oct-20

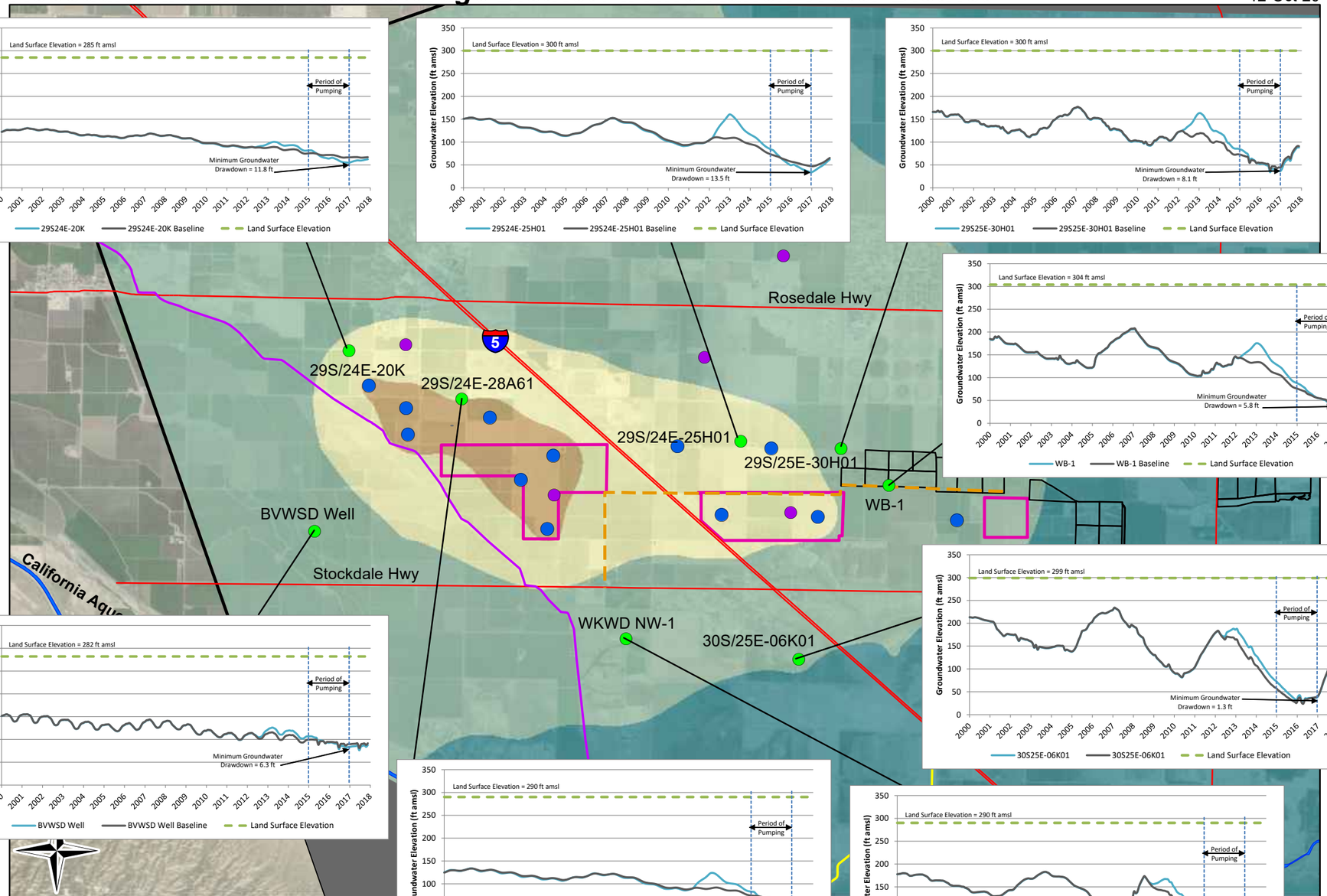
Kern Fan Groundwater Storage Project











0 0.5 1 2 Miles

NAD 83 Stateplane Zone 5

Map Features

Maximum Groundwater Level Drawdown (ft)

- 0 to 10
- 0 to -10
- -10 to -20
- -20 to -30
- < -30
- SGMA RMS Well
- Proposed Extraction Well
- Modeled Observation Point
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Eastside Canal
- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Inactive
- Water Courses

Intermediate Aquifer Maximum Model-Predicted Groundwater Pumping Drawdown December 2016

Figure 7

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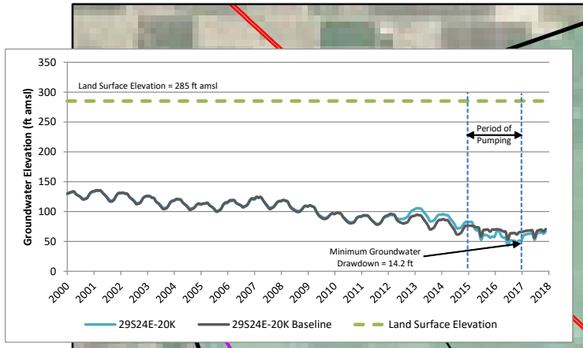
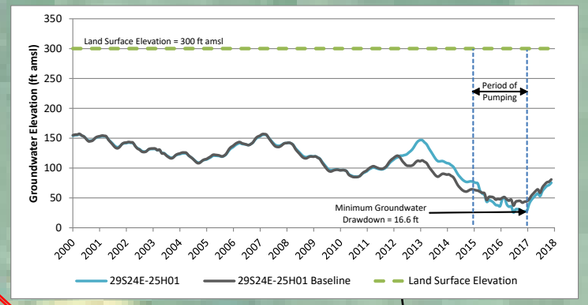
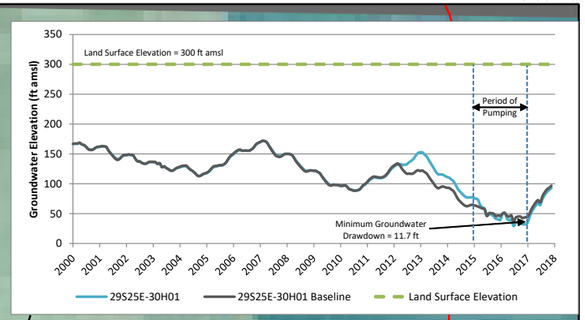
Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

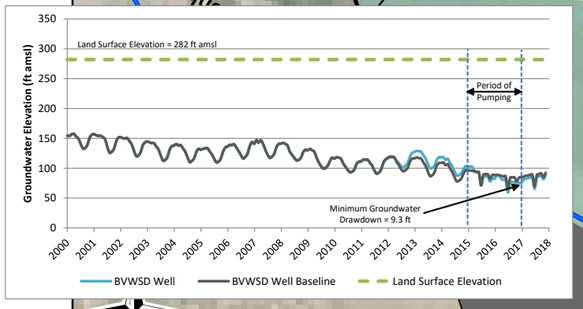
12-Oct-20

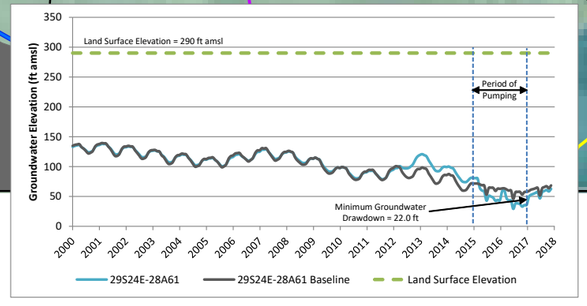
Kern Fan Groundwater Storage Project

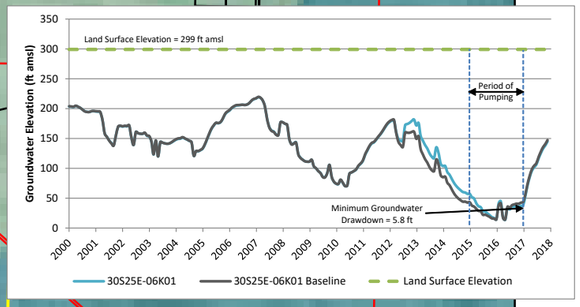


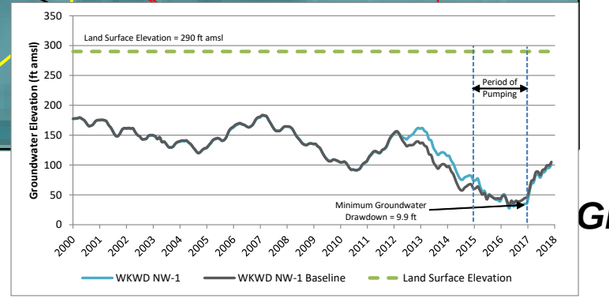












Map Features

Maximum Groundwater Level Drawdown (ft)

- 0 to 10
- 0 to -10
- -10 to -20
- -20 to -30
- < -30
- SGMA RMS Well
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- Inactive
- Water Courses

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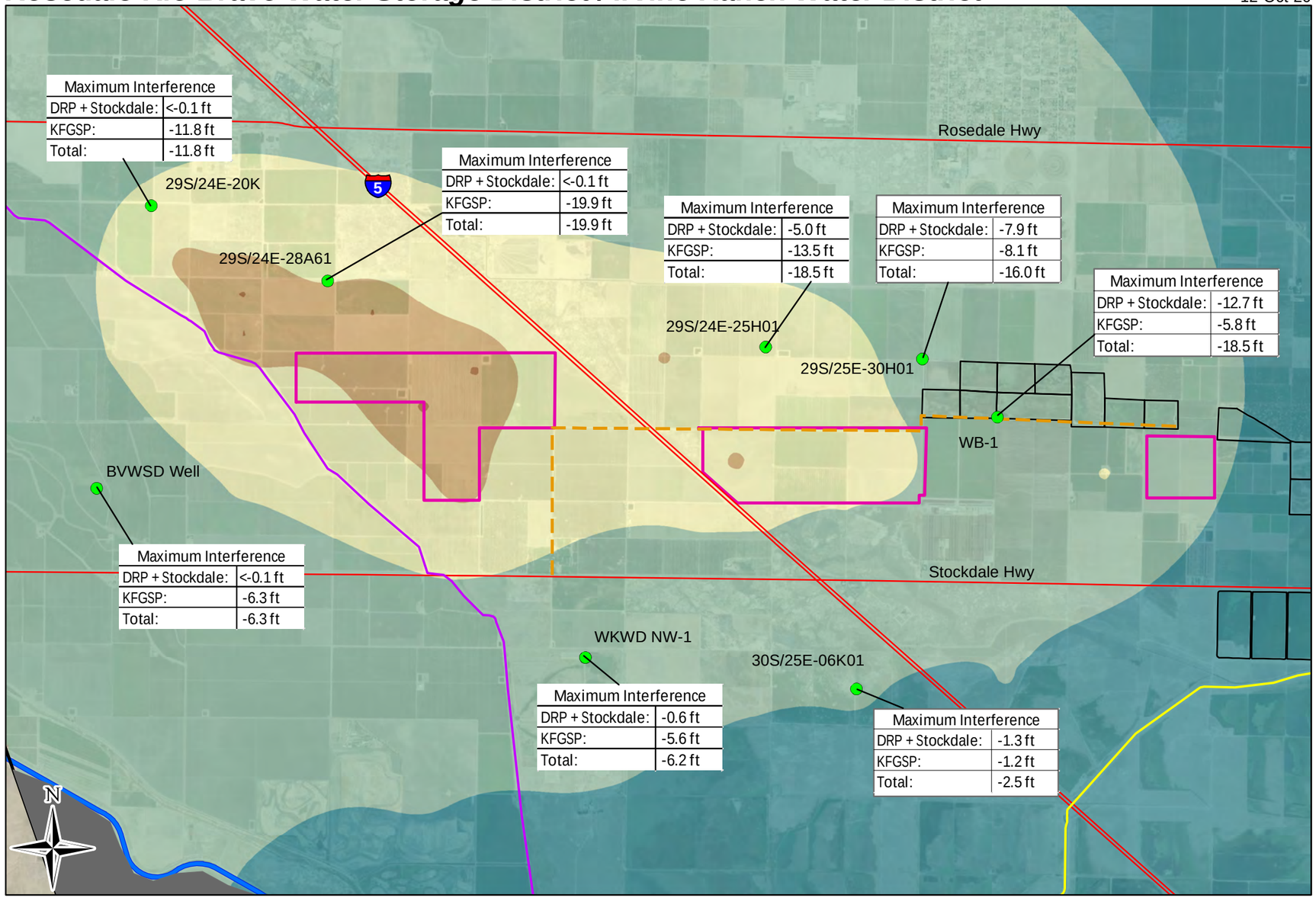
Deep Aquifer Maximum Model-Predicted Groundwater Pumping Drawdown December 2016

Figure 8

Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

12-Oct-20



NAD 83 Stateplane Zone 5

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Kern Fan Groundwater Storage Project

Map Features

Maximum Groundwater Level Drawdown (ft)

- 0 to 10
- 0 to -10
- -10 to -20
- -20 to -30
- < -30
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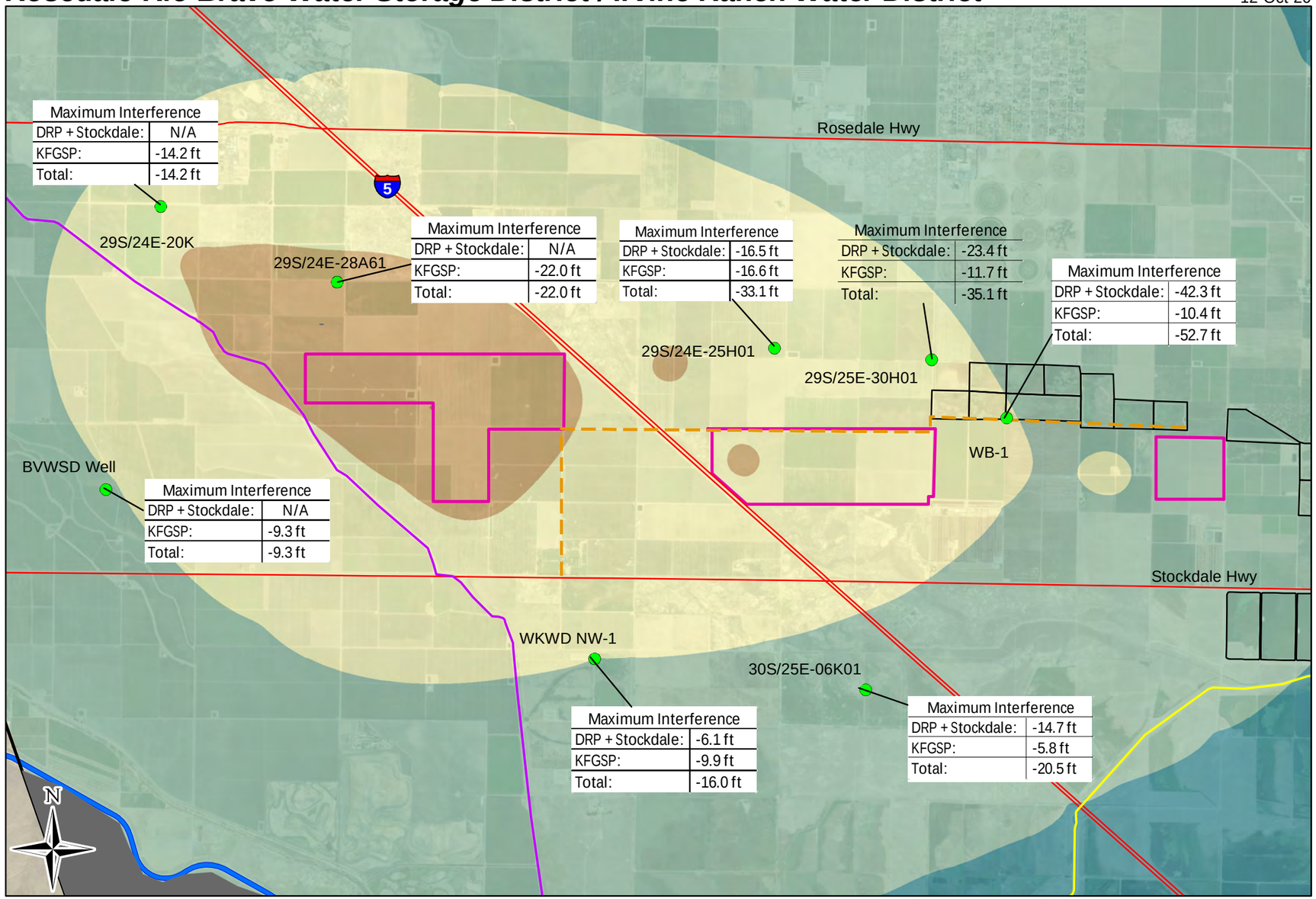
- Inactive
- Water Courses

Intermediate Aquifer Maximum Cumulative Model-Predicted Pumping Interference

Figure 9

Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

12-Oct-20



NAD 83 Stateplane Zone 5

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Kern Fan Groundwater Storage Project

Map Features

Maximum Groundwater Level Drawdown (ft)

- 0 to 10
- 0 to -10
- -10 to -20
- -20 to -30
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- Inactive
- Water Courses

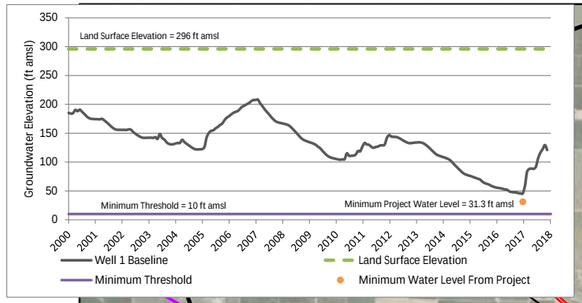
Deep Aquifer Maximum Cumulative Model-Predicted Pumping Interference

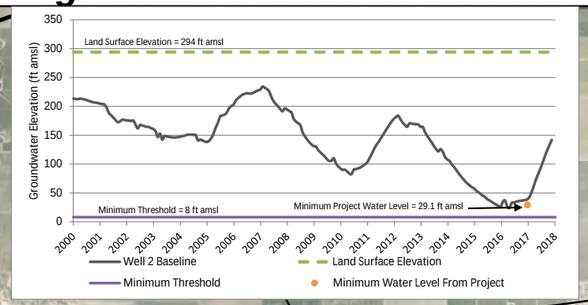
Figure 10

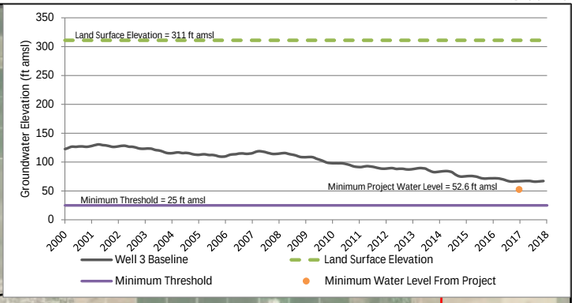
Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

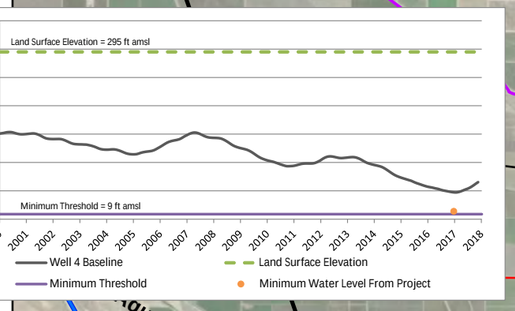
12-Oct-20

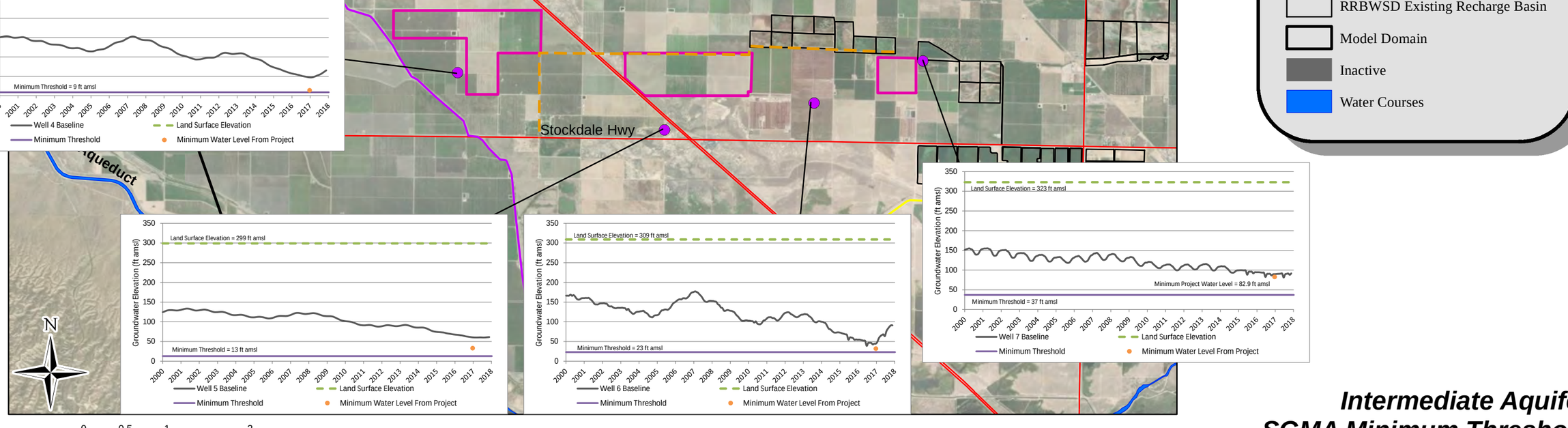
Kern Fan Groundwater Storage Project











Map Features

- SGMA Water Level Well
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
- Eastside Canal
- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Inactive
- Water Courses

0 0.5 1 2 Miles

NAD 83 Stateplane Zone 5

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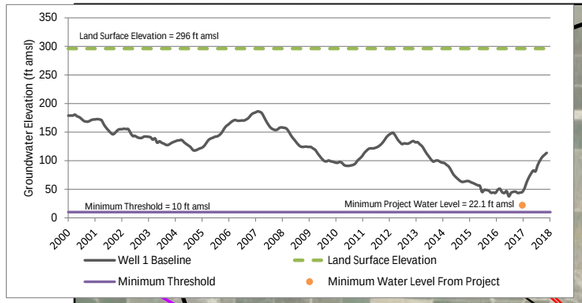
Intermediate Aquifer SGMA Minimum Threshold Project Impacts December 2016

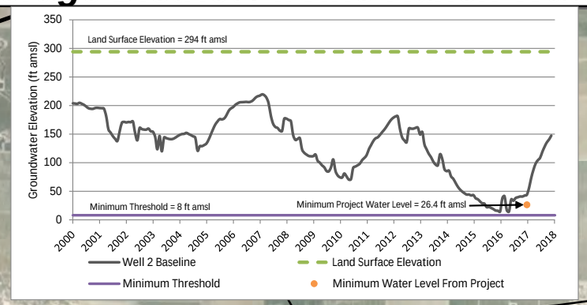
Figure 11

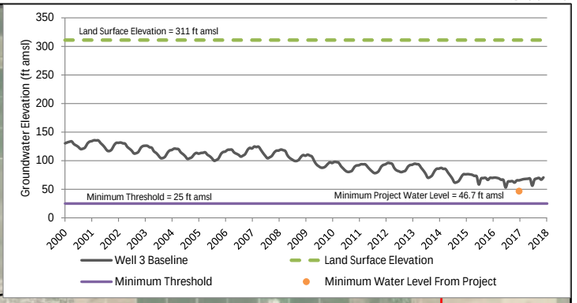
Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District

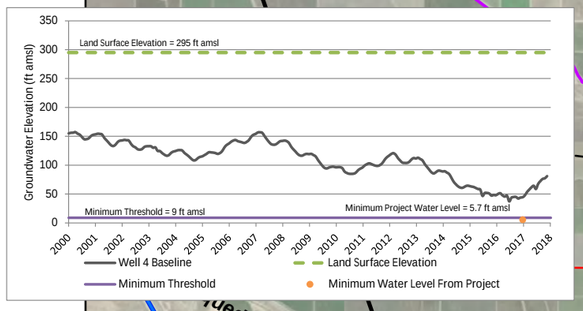
12-Oct-20

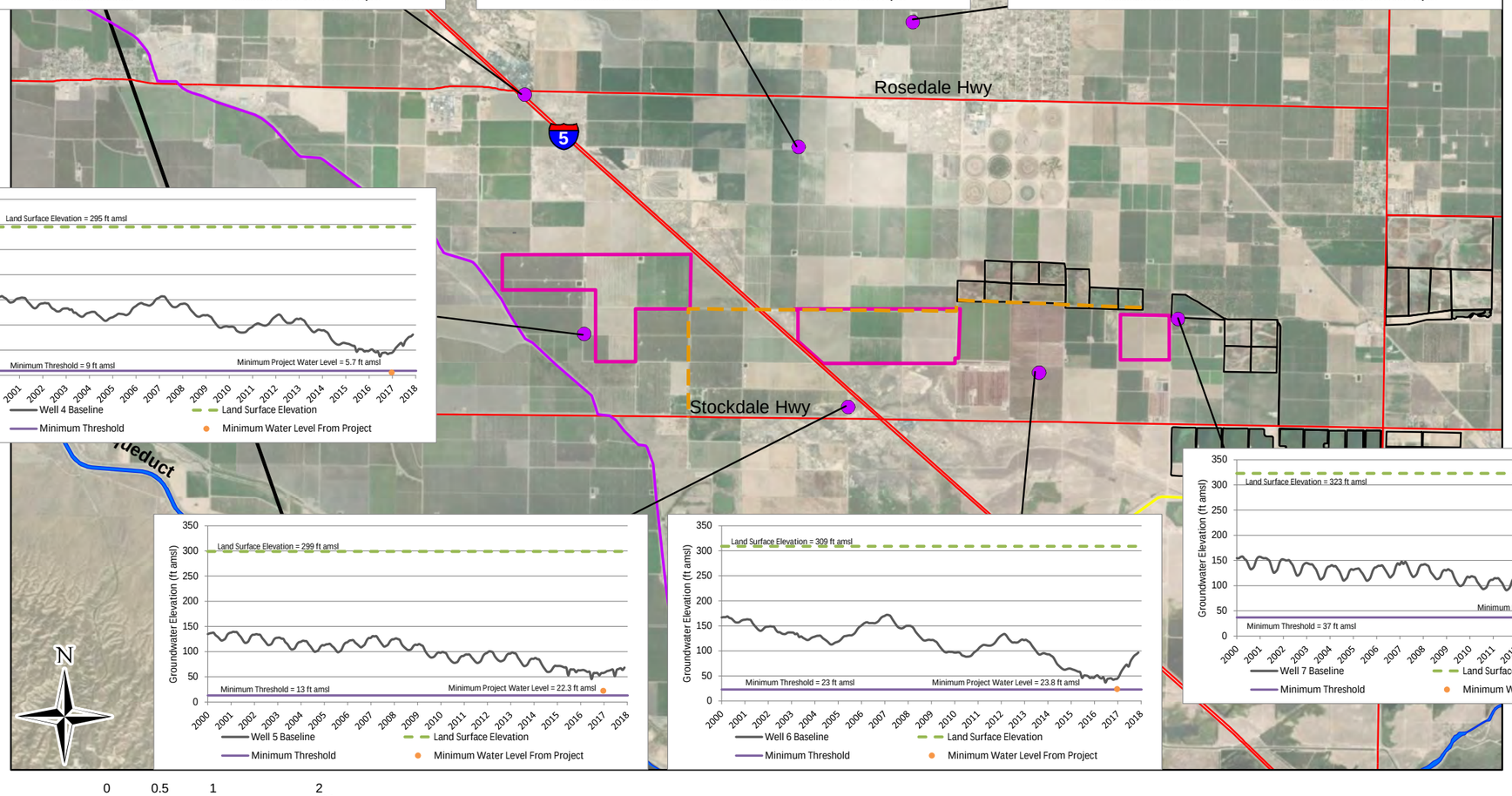
Kern Fan Groundwater Storage Project

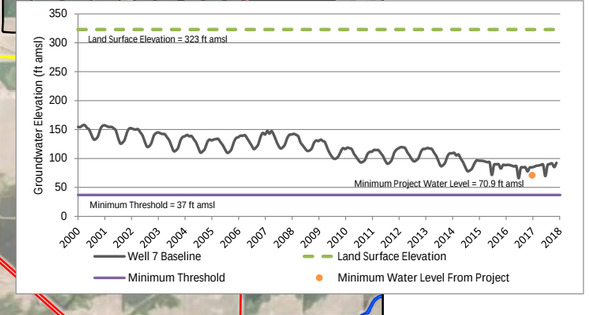












0 0.5 1 2 Miles

NAD 83 Stateplane Zone 5

Thomas Harder & Co.
Groundwater Consulting

Map Features

- SGMA Water Level Well
- Potential Pipeline Alignment Per 30% Preliminary Design Report (Dee Jaspar & Associates, 2020)
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- CVC Canal
- Highway/Road
- Proposed Recharge Basin
- RRBWSD Existing Recharge Basin
- Model Domain
- Inactive
- Water Courses

Deep Aquifer SGMA Minimum Threshold Project Impacts December 2016

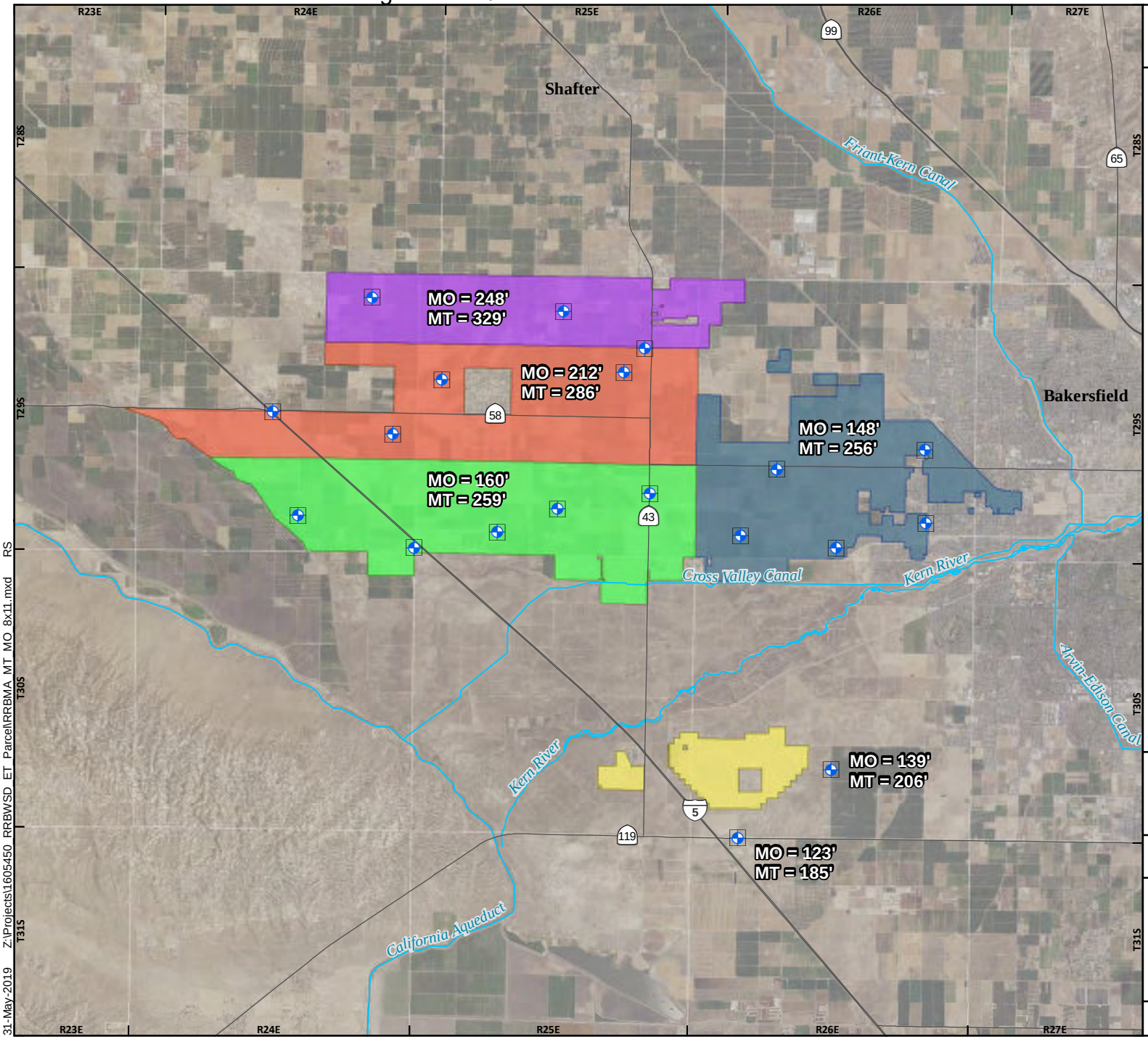
Figure 12

Attachment A

RRBMA Minimum Thresholds and Measurable Objectives

Kern Fan Groundwater Storage Project
Attachment A

Rosedale-Rio Bravo Water Storage District / Irvine Ranch Water District



RRBMA MINIMUM THRESHOLDS AND MEASURABLE OBJECTIVES

MO - Measurable Objective
MT - Minimum Threshold
Depth to Groundwater

RRBMA Water Level Well

Proposed Monitoring Zones

- East Zone
- South Zone
- Central Zone
- North Zone
- South of River Zone

All Other Features

- Highway
- Waterway

N

0 1.5 3 6
Miles

Rosedale-Rio Bravo Management Area
Kern County, California

Rosedale-Rio Bravo WSD

GEI Consultants

DECEMBER 2019 FIGURE 33

31-May-2019 Z:\Projects\1605450_RRBWSD_ET_Parcel\RRBMA_MT_MO_8x11.mxd RS

Source: ROSEDALE-RIO BRAVO Management Area Groundwater Sustainability Plan Chapter