Recirculated
Draft Environmental Impact Report

SCH# 2022030180

Volume 1

Chapters 1 – 12

CARBON TERRAVAULT I (KERN COUNTY)

by California Resources Corporation *(PP22405)*

Zone Change Case No. 5, Map No. 119
Zone Change Case No. 4, Map No. 120
Conditional Use Permit No. 13, Map No. 118
Conditional Use Permit No. 14, Map No. 118
Conditional Use Permit No. 5, Map No. 119
Conditional Use Permit No. 6, Map No. 119
Conditional Use Permit No. 3, Map No. 120
Conditional Use Permit No. 2, Map No. 138

Kern County
Planning and Natural Resources Department
Bakersfield, California

June 2024

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PLANNING AND NATURAL RESOURCES DEPARTMENT

Planning
Community Development
Administrative Operations

RECIRCULATED

NOTICE OF AVAILABILITY FOR PUBLIC REVIEW AND HEARING ON THE DRAFT RECIRCULATED ENVIRONMENTAL IMPACT REPORT FOR THE CARBON TERRAVAULT I (KERN COUNTY) PROJECT

This is to advise that the Kern County Planning and Natural Resources Department has prepared a Draft Recirculated Environmental Impact Report (EIR) for the project identified below.

CEQA Guidelines Section 15088.5(f)(1) provides that when an EIR is recirculated, Kern County, as Lead Agency, may require that reviewers submit new comments on the entire EIR, and the Lead Agency need not to respond to those comments received in the earlier circulation period. Kern County will therefore respond in the Final Recirculated EIR to only comments submitted during this comment period and through the Planning Commission and Board of Supervisors hearings.

As mandated by State law, the minimum public review period for this document is 45 days.

PROJECT TITLE: Draft Recirculated EIR Carbon TerraVault I (Kern County) by California Resources Corporation (CRC) (PP22405); ZCC 5, Map 119; ZCC 4, Map 120; CUP 13, Map 118; CUP 14, Map 118; CUP 5, Map 119; CUP 6, Map 119; CUP 3, Map 120; CUP 2, Map 138.

PROJECT LOCATION: Within the administrative boundary of the Elk Hills oilfield, which is owned and operated by CRC in unincorporated Kern County. The proposed project area is situated on the west side of Elk hills Road and the north side of Skyline Road. It is located on Sections 12 and 13 of Township 30 South, Range 22 East; Sections 7, 8, 17-22, 25-30, and 34-36 of Township 30 South, Range 23 East; Section 30 and 31 Township 30 South, Range 24 East; and Section 1 of Township 31 South, Range 23 East of the Mount Diablo Base and Meridian (MDBM). The boundaries of the Carbon Capture and Storage (CCS) Surface Land Area and Underground Storage Area (pore space) for the proposed project are approximately 26 miles from Bakersfield city center, approximately 8.5 miles from the City of Taft, approximately five (5) miles from the unincorporated community of Tupman, and approximately four (4) miles from the unincorporated community of Buttonwillow.

DOCUMENT AVAILABILITY: The Draft Recirculated EIR and the documents referenced in it are available for public review at the Planning and Natural Resources Department, which is located at 2700 "M" Street, Suite 100, in Bakersfield, CA 93301 or on the Department website at: https://kernplanning.com/environmental-doc/carbon-terravault-1-kerncounty

PUBLIC COMMENT: The required Draft Recirculated EIR public review period is 45 days.

June 4th, 2024 – July 18th, 2024

Written comments may be submitted to the project planner identified below prior to the close of the Draft Recirculated EIR public review period on **July 18th, 2024, at 5:00 p.m.** to:

Kern County Planning and Natural Resources Department
ATTN: Keith Alvidrez, Planner II
2700 "M" Street, Suite 100, Bakersfield, CA 93301
Phone: (661) 862-5015
E-mail: CTV1EIRComments@kerncounty.com

PUBLIC HEARING: A public hearing has been scheduled with the Kern County Planning Commission to consider a recommendation on the project and solicit comments on the adequacy and completeness of the analysis and proposed mitigation measures described in the Draft Recirculated EIR. You may comment by providing testimony at the public hearing on:

DATE: **August 22, 2024**
TIME: **7:00 P.M. or soon thereafter**
LOCATION: **Chambers of the Board of Supervisors**
Kern County Administrative Center, First Floor
1115 Truxtun Avenue, Bakersfield, CA 93301

After consideration by the Planning Commission, a public hearing will be scheduled for the Kern County Board of Supervisors for final consideration and action. Comments may be provided at that hearing or prior to any action by the Board of Supervisors on any matter. The Board of Supervisors decision is final.

If you challenge the action taken on this request in court, you may be limited to raising only those issues you or someone else raised at this public hearing, or in written correspondence delivered to the Planning and Natural Resources Department at, or prior to, the public hearing.

ASSISTANCE: If you have any **questions** about the proposed project or issues accessing the document, please contact the project planner directly :

Kern County Planning and Natural Resources Department
ATTN: Keith Alvidrez, Planner II
2700 "M" Street, Suite 100, Bakersfield, CA 93301
Phone: (661) 862-5015
E-mail: Alvidrezk@kerncounty.com

PROJECT DESCRIPTION: A proposed CCS facility for permanent underground storage of up to 48 million tons of CO_2 in two reservoir formations on approximately 9,104 surface acres in the Elk Hills Oilfield in unincorporated Kern County and the related initial source for the capture of CO_2. The land acreage of the CCS Land Surface Area, which comprises the Conditional Use Permits being considered, has been reduced from the original 9, 130 acres to 9,104 acres through changes in the location of the facility onsite pipeline.

The initial source of CO_2 is the pre-combustion oilfield gas from infield locations, including uses associated with the existing Elk Hills Power Plant. Maximum injection per year from future sources would be up to 2, 210,000 tons per year divided between the two formations (R-26 and A1-A-2). The facility consists of an underground pore space, approved by the EPA as the "area of review" where CO_2 will become permanently mineralized into rock, the CCS Surface Land Area over the underground storage area where limited uses will be permitted, approval of six (6) EPA Class VI UIC wells, conversion and creation of wells for CO_2 leak monitoring and seismic activity, approximately 11 miles of facility and injection underground pipeline for capture of pre-combustion gas, and the related infrastructure improvements for the capture, transfer, and permanent storage of CO_2.

Implementation of the proposed project includes the following requests :

- Zone Change Cases (ZCC No. 5, Map No. 118 and ZCC No. 4, Map No. 120): From A-1 (Limited Agriculture) to A (Exclusive Agriculture) on approximately 6,160 acres; and

- Conditional Use Permits (CUP No. 13 Map No. 118, CUP No. 14 Map No. 118, CUP No. 5 Map 119, CUP No. 6 Map 119, CUP No. 3, Map 120, CUP No. 2 Map No. 138): For a CCS underground facility for CO_2 storage, the capture of pre-combustion oilfield gas as a source, and the transport of CO_2 by underground facility pipeline on approximately 9,104 surface acres in the A (Exclusive Agriculture) Zone District.

ENVIRONMENTAL REVIEW FINDINGS: Anticipated significant and unavoidable impacts on Agricultural Resources, Air Quality, Biological Resources, Cultural Resources, Energy, Geology and Soils, Greenhouse Gases, Water Supply (Hydrology), Energy, Mineral Resources, Noise, and Water Supply (Utilities and Service Systems.)

LORELEI H. OVIATT, AICP, Director
Planning and Natural Resources Department

To be published once only on next available date and as soon as possible

THE BAKERSFIELD CALIFORNIAN
TAFT MIDWAY DRILLER

KTA (06/04/24)

cc: County Clerk (2) (with fee)
Environmental Status Board
Supervisorial District No. 4

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Carbon TerraVault I (Kern County)
Notification List

City of Arvin
P.O. Box 548
Arvin, CA 93203

Bakersfield City Planning Dept
1715 Chester Avenue
Bakersfield, CA 93301

Bakersfield City Public Works Dept
1501 Truxtun Avenue
Bakersfield, CA 93301

California City Planning Dept
21000 Hacienda Blvd.
California City, CA 93515

Delano City Planning Dept
P.O. Box 3010
Delano, CA 93216

City of Maricopa
P.O. Box 548
Maricopa, CA 93252

City of McFarland
Attn: Paul Saldana
401 West Kern Avenue
McFarland, CA 93250

City of Ridgecrest
100 West California Avenue
Ridgecrest, CA 93555

City of Shafter
336 Pacific Avenue
Shafter, CA 93263

City of Taft
Planning & Building
209 East Kern Street
Taft, CA 93268

City of Tehachapi
Attn: John Schlosser
115 South Robinson Street
Tehachapi, CA 93561-1722

City of Wasco
764 E Street
Wasco, CA 93280

Inyo County Planning Dept
P.O. Drawer "L"
Independence, CA 93526

Kings County Planning Agency
1400 West Lacey Blvd, Bld. 6
Hanford, CA 93230

San Joaquin County Community
Development Department
1810 E Hazelton Ave
Stockton, CA 95205

Solano County Department of Resource
Management – Planning Services Division
675 Texas Street, Suite 5500
Fairfield, CA 94533

Sacramento County Planning and
Environmental Review
827 7th Street
Sacramento, CA 95814

Fresno County Public Works and Planning
2220 Tulare Street, 6TH Floor
Fresno, CA 93721

Los Angeles Co Reg Planning Dept
320 West Temple Street
Los Angeles, CA 90012

San Bernardino Co Planning Dept
385 North Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415-0182

Santa Barbara Co Resource Mgt Dept
123 East Anapamu Street
Santa Barbara, CA 93101

Tulare County Planning & Dev Dept
5961 South Mooney Boulevard
Visalia, CA 93291

San Luis Obispo Co Planning Dept
Planning and Building
976 Osos Street
San Luis Obispo, CA 93408

Ventura County RMA Planning Div
800 South Victoria Avenue, Unit 1700
Ventura, CA 93009-1740

U.S. Bureau of Land Management
Caliente/Bakersfield
35126 McMurtrey Avenue
Bakersfield, CA 93308

Federal Aviation Administration
Western Reg Office
777 South Aviation Boulevard, Suite 150
El Segundo, CA 90245

Federal Communications Comm
18000 Studebaker Road, #660
Cerritos, CA 90701

U. S. Fish & Wildlife Service
Division of Ecological Services
2800 Cottage Way
Sacramento, CA 95825-1846

Environmental Protection Agency
Region IX Office
75 Hawthorn Street
San Francisco, CA 94105

California Air Resources Board
Stationary Resource Division
P.O. Box 2815
Sacramento, CA 95812

So. San Joaquin Valley Arch Info Ctr
California State University of Bkfd
9001 Stockdale Highway
Bakersfield, CA 93311

Caltrans District 6
Planning/Land Bank Bldg.
P.O. Box 12616
Fresno, CA 93778

Caltrans/
Division of Aeronautics, MS #40
P.O. Box 942873
Sacramento, CA 94273-0001

State Dept of Conservation
Director's Office
801 "K" Street, MS 24-01
Sacramento, CA 95814-3528

State Dept of Conservation
Geologic Energy Management Division
11000 River Run Boulevard
Bakersfield, CA 93311

California State University
Bakersfield – Library
9001 Stockdale Highway
Bakersfield, CA 93309

California Energy Commission
James W. Reed, Jr.
1516 Ninth Street
Mail Stop 17
Sacramento, CA 95814

California Fish & Wildlife
1234 East Shaw Avenue
Fresno, CA 93710

California Regional Water Quality
Control Board/Central Valley Region
1685 E Street
Fresno, CA 93706-2020

State Dept of Toxic Substance Control
Environmental Protection Agency
1515 Tollhouse Road
Clovis, CA 93612

Cal Environmental Protection Agency
Dept of Toxic Substances Control, Reg 1
Attn: Dave Kereazis, Permit Div – CEQA
8800 Cal Center Drive, 2nd Floor
Sacramento, CA 95826

State Dept of Water Resources
San Joaquin Dist.
3374 East Shields Avenue, Room A-7
Fresno, CA 93726

State Dept of Water Resources
Div. Land & Right-of-Way
P.O. Box 942836
Sacramento, CA 94236

Kern County Airports Department

Kern County Administrative Officer

Kern County Public Works Department
Building & Development/Floodplain

Kern County Public Works Department
Building & Development/Survey

Kern County Environmental
Health Services Department

Kern County Fire Dept (Put in Fire Box)
Regina Arriaga
Roxanne Routh
Jim Killam

Kern County Fire Dept
Aaron Duncan, Fire Chief

Kern County Library/Beale
Local History Room

Kern County Library/Beale
Andie Sullivan

Kern County Sheriff's Dept
Administration

Kern County Public Works Department
Building & Development
Development Review

Kern County Public Works Department
Operations & Maintenance
Regulatory Monitoring & Reporting

Kern High School District
5801 Sundale Avenue
Bakersfield, CA 93309

Kern County Superintendent of Schools
Attention School District Facility Services
1300 – 17th Street
Bakersfield, CA 93301

Kern County Fire Dept
Michael Nicholas, Assistant Fire Marshal

Kern County Water Agency
3200 Rio Mirada Drive
Bakersfield, CA 93308

San Joaquin Valley
Air Pollution Control District
1990 East Gettysburg Avenue
Fresno, CA 93726

West Side Mosquito
Abatement Dist.
P.O. Box 205
Taft, CA 93268

Adams, Broadwell, Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Kern Audubon Society
Attn: Frank Bedard, Chairman
4124 Chardonnay Drive
Bakersfield, CA 93306

Center on Race, Poverty, & Environment
5901 Christie Avenue, Suite 208
Emeryville, CA 94608

Center on Race, Poverty, & Environment
CA Rural Legal Assistance Foundation
1012 Jefferson Street
Delano, CA 93215

Defenders of Wildlife
Kim Delfino, California Director
980 – 9th Street, Suite 1730
Sacramento, CA 95814

Native American Heritage
Council of Kern County
Attn: Gene Albitre
18169 Highway 155
Woody, CA 93287

Pacific Gas & Electric Company
Land Projects
650 "O" Street, First Floor
Fresno, CA 93760-0001

Sierra Club/Kern Kaweah Chapter
P.O. Box 3357
Bakersfield, CA 93385

Southern California Gas Co
35118 McMurtrey Avenue
Bakersfield, CA 93308-9477

Southern California Gas Co
Transportation Dept
9400 Oakdale Avenue
Chatsworth, CA 91313-6511

Verizon California, Inc.
Attention Engineering Department
520 South China Lake Boulevard
Ridgecrest, CA 93555

U.S. Dept of Agriculture/NRCS
5080 California Avenue, Suite 150
Bakersfield, CA 93309-0711

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Justice & Accountability
2210 San Joaquin Street
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Bakersfield, CA 93301

Northwest Kern Resource Cons Dist.
5080 California Avenue, Suite 150
Bakersfield, CA 93309

Kern County Library
Buttonwillow Branch
116 Buttonwillow Avenue
Buttonwillow, CA 93206

Kern County Library
Taft Branch
27 Emmons Park Drive
Taft, CA 93268

Taft Union High School Dist.
701 – 7th Street
Taft, CA 93268

Taft City School Dist.
820 North 6th Street
Taft, CA 93268

Elk Hills School Dist.
P.O. Box 129
Tupman, CA 93276

Buttonwillow Union School Dist.
42600 Highway 58
Buttonwillow, CA 93206

Buttonwillow Rec & Parks Dist.
P.O. Box 434
Buttonwillow, CA 93206-9320

McKittrick School Dist.
P.O. Box 277
McKittrick, CA 93251

West Side Rec & Parks Dist.
500 Cascade Place, Building C
Taft, CA 93268

Rosedale-Rio Bravo Water Dist.
849 Allen Road
Bakersfield, CA 93314

Lozeau Drury LLP
1939 Harrison Street, Suite 150
Oakland, CA 94612

California Natural Resources Agency
Secretary Wade Crowfoot
715 P Street 20th Floor
Sacramento, CA 95814

California Air Resources Board
Industrial Strategic Division
Matthew Bohill, Chief
P.O. Box 2815
Sacramento, CA 95812

California Energy Commission
Attn: David Hochschild
715 P Street
Sacramento, CA 95814

California Public Utilities Commission
Attn: President Alice Reynolds
505 Van Ness Avenue
San Francisco, CA 94102

California State Geological Survey
Attn: Steve Bohlan
801 K Street MS 12-30
Sacramento, CA 95814

Buttonwillow County Water Dist.
P.O. Box 874
Buttonwillow, CA 93206

California Dept of Conservation
Geologic Energy Management Division
801 K Street, MS 20-20
Sacramento, CA 95814

Center on Race, Poverty, & Environment
1012 Jefferson Street
Delano, CA 93215

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Andrew Bremner
P.O. Box 82515
Bakersfield, CA 93308

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7000 East Avenue, B-661, L-794
Livermore, CA 94550

WZI, Inc.
1717 – 28th Street
Bakersfield, CA 93301

QK Inc,
Chris Mynk
5080 California Ave. Suite 220
Bakersfield, CA 93309

Chevron, USA
9525 Camino Media
Bakersfield, CA 93311

Stanford University
Energy Resources Engineering Center of Carbon Storage
367 Panama Street
Stanford, CA 94305

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Attn: Janea Benton
10000 Ming Avenue
Bakersfield, CA 93311

Exxon/Mobil Production Company
Attn: Troy Tranquada
12000 Calle Real
Goleta, CA 93117

CIPA
Attn: Trent Rosenlibe
1001 K Street, 6th Floor
Sacramento, CA 95814

Berry Corporation
11117 River Run Blvd.
Bakersfield, CA 93311

Hathaway, LLC
Attn: Chad Hathaway
P.O. Box 81385
Bakersfield, CA 93380

California Office of Emergency Services
3650 Schriever Ave.
Mather, CA 95655

Halliburton
34722 Seventh Standard Road
Bakersfield, CA 93314

Macpherson Oil Company
P.O. Box 5368
Bakersfield, CA 93388

WSPA
Attn: Suzanne Noble
1518 Mill Rock Way, Suite 103 Bakersfield, CA 93311

Seneca Resources Corporation
2131 Mars Court
Bakersfield, CA 93308

Venoco, Inc.
Attn: Ian Livett
6267 Carpentaria Avenue, Suite 100
Carpentaria, CA 93013

Kern Oil and Refining
7724 East Panama Lane
Bakersfield, CA 93307

Naftex Operating Company
P.O. Box 308
Edison, CA 93220

Office of Public School Construction
707 Third Street, Fourth Floor
West Sacramento, CA 95605

E&B Natural Resources Management
1600 Norris Road
Bakersfield, CA 93309

San Joaquin Refining
3129 Standard Street
Bakersfield, CA 93308

Tricor Refining, LLC
1134 Manor Street
Bakersfield, CA 93308

Kern County Public Health
Services Department

Native American Heritage Commission
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691

Key Energy Services, Inc.
5080 California Avenue
Bakersfield, CA 93309

Hess Corporation
1675 Chester Avenue
Bakersfield, CA 93301

PCL Industrial Services
1500 Union Avenue
Bakersfield, CA 93307

California Department of
Food and Agriculture
1220 N Street
Sacramento, CA 95814

Vintage Production California
9600 Ming Avenue, Suite 300
Bakersfield, CA 93311

Sturgeon Services Int'l
3511 Gilmore Avenue
Bakersfield, CA 93308

CAL FIRE
PO Box 944246
Sacramento, CA 94244-246

Kern Citizens for Energy
5001 California Avenue, Suite 211
Bakersfield, CA 93309

Weatherford Completions
Attn: Gregg Hurst
5060 California Avenue, Suite 1150
Bakersfield, CA 93309

Total Western
2811 Fruitvale Avenue
Bakersfield, CA 93308

Baker Hughes
3901 Fanucchi Way
Shafter, CA 93263

Schlumberger Oilfield Services
2157 Mohawk Street
Bakersfield, CA 93308

Nabors Completion & Production
3651 Pegasus Drive, Suite 101
Bakersfield, CA 93308

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Environmental Law and Justice Clinic,
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Open Government Coordinator
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Portland, OR 97211-0974

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Dolores Huerta, President
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Bakersfield, CA 93303

Dolores Huerta Foundation
Camila Chavez, Executive Director
P.O. Box 2087
Bakersfield, CA 93303

Kern Community College District
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2100 Chester Avenue
Bakersfield, CA 93301

Kern Community College District
Bonita Steele, Ed. D
Director, Programs and Program Development
2100 Chester Avenue
Bakersfield, CA 93301

City of Bakersfield
Mayor Karen Goh
Office of the Mayor
1501 Truxtun Avenue
Bakersfield, CA 93301

Governor's Office of Business and
Economic Development
Dee Dee Myers, Senior Advisor & Director
1325 J Street, 18th Floor
Sacramento, CA 95814

California Workforce Development Board
Tim Rainey, Executive Director
800 Capitol Mall, Suite 1022
Sacramento, CA 95814

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Bakersfield, CA 93311

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2501 Portola Way
Sacramento, CA 95818

Kern County Farm Bureau
Rachel Nettleton, Executive Director
1800 30th Street, Suite 390
Bakersfield, CA 93301

Climate Now
Attn: James Lawler
P.O. Box 133
East Chatham, NY 12060

Employers' Training Resource
1600 East Belle Terrace
Bakersfield, CA 93307

Greater Bakersfield Chamber of Commerce
Janelle Capra, President & CEO
1725 Eye Street
Bakersfield, CA 93301

International Brotherhood Electrical Workers
Brian Holt, Business Manager
3921 Sillect Avenue
Bakersfield, CA 93308

Tejon Indian Tribe
Octavio Escobedo, Tribal Chair
P.O. Box 640
Arvin, CA 93203

Building Trades Council
Kern, Inyo, & Mono Counties, AFL-CIO
John Spaulding, Executive Secretary
200 West Jeffrey Street
Bakersfield, CA 93305-2434

California Independent Systems Operators
250 Outcropping Way
Folsom, CA 95630

Center for Biological Diversity
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266 Canyon Lakes Place
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Defenders of Wildlife
Sophia Markowska
P.O. Box 401
Folsom, CA 95763

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10000 Ming Avenue
Bakersfield, CA 93311

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200 Park Avenue, 11th Floor
New York, NY 10166

Encompass Capital Advisors LLC
Attn: Todd Kantor
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New York, NY 10166

Earth Justice
50 California Street, Suite 500
San Francisco, CA 94111

Environmental Law & Justice Clinic
Attn: Lucas Williams
Golden Gate University of Law
536 Mission Street
San Francisco, CA 94105

Environmental Law & Justice Clinic
Attn: Susann Bradford
Golden Gate University of Law
536 Mission Street
San Francisco, CA 94105

TC Energy
Jared Aranda, Advisor
1140 Financial Blvd., Suite 900
Reno, NV 89502

State Dept of Conservation
Office of Land Conservation
801 “K” Street, MS 18-01
Sacramento, CA 95814

US EPA Region IX
Attn: David Albright
Manager Groundwater Protection Section
75 Hawthorne Street
San Francisco, CA 94105

Tejon Indian Tribe
Attn: Candice Garza
4941 David Road
Bakersfield, CA 93307

Torres Martinez Desert Cahuilla Indians
Attn: Michael Mirelez
Cultural Resources Coordinator
P.O. Box 1160
Thermal, CA 92274

Twenty-Nine Palms Band of Mission Indians
Attn: Darrell Mike, Tribal Chairman
46-200 Harrison Place
Coachella, CA 92236

Twenty-Nine Palms Band of Mission Indians
Attn: Anthony Madrigal Jr.
Tribal Grants Administrator
46-200 Harrison Place
Coachella, CA 92236

Yuhaaviatam of San Manuel Nation
Attn: Alexandra McCleary, Ph.D.
Cultural Resources Management Department
26569 Community Center Drive
Highland, CA 92346

California Division of State Architect
1102 Q Street, Suite 5100
Sacramento, CA 95811

California Department of Education
1430 N Street
Sacramento, CA 95814

Buena Vista Museum of Natural
History & Science
2018 Chester Ave
Bakersfield, CA 93301

California Air Pollution Control
Officers Association
1107 9th Street, Unit 801
Sacramento, CA 95814

Federal Motor Carrier Safety Administration
United States Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590

U.S. Department of Labor Occupational
Safety and Health Administration
200 Constitution Ave NW
Washington, DC 20210

California Department of Industrial Relations,
Division of OSHA
2550 Mariposa Mall, Room 2005
Fresno, CA 93721

California State Fire Marshall
P.O. Box 944246
Sacramento, CA 94244

U.S. Department of Transportation PHMSA
1200 New Jersey Avenue, SE
Washington, DC 20590

Kern-Kaweah Chapter Sierra Club
Stephan Montgomery, Chair
Box 3357
Bakersfield, CA 93385

Lideres Campesinas
Yuriria Lopez, Organizadora Comunitaria
319 Lambert Street
Oxnard, CA 93036

Clean Water Action
Jesus Alonso
1444 I street NW, Suite 400
Washington, DC 20005

Leadership Counsel for
Justice & Accountability
Emma De La Rosa, Regional Policy Manager
2210 San Joaquin Street
Fresno, CA 93721

Center on Race, Poverty, & Environment
Kayla Karimi, Staff Attorney
1012 Jefferson Street
Delano, CA 93215

Central Valley Air Quality Coalition
Jasmin Martinez, Coalition Coordinator
1252 Fulton Street
Fresno, CA 93721

Central California Asthma Collaborative
Gustavo Aguirre, Associate Director
1939 N Gateway Blvd, Suite 103
Fresno, CA 93727

Central California Environmental
Justice Network
Ileana Navarro, Community Organizer
930 Truxton Ave Street
Bakersfield, CA 93301

Visión y Compromiso
Nataly Santamaria
1000 Alameda Street
Los Angeles, CA 90012

Dolores Huerta Foundation
Noe Garcia, Director
P.O. Box 2087
Bakersfield, CA 93303

Center for Biological Diversity
Attn: Victoria Bogdan Tejada
1212 Broadway, St. #800
Oakland, CA 94612

158 090 16 00 4
ELK HILLS POWER LLC
PO BOX 27570
HOUSTON TX 77227-7570

157 060 02 00 7
CALIFORNIA RESOURCES
ELK HILLS LLC
27200 TOURNEY RD STE 200
SANTA CLARITA CA 91355-4910

157 010 02 00 2
CHEVRON USA INC
P O BOX 1392
BAKERSFIELD CA 93302-1392

158 040 01 02 3
U S A
1600 PENNSYLVANIA AV NW
WASHINGTON DC 20500

Erika Wanenmacher
1422 Agua Fria St
Santa Fe, NM 87505

Resident
950 Avis Dr
El Cerrito, CA 94530

Scott Jung
124 Monterey Rd, Unit 204
South Pasadena , CA 91030

Lucy Clark
HC 3 Box 88, Granite Station
Bakersfield , CA 93308

Abbie Bernstein
1245 N Kings Rd, Apt 7
West Hollywood, CA 90069

Dan and Lilly Kittredge
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La Mesa , CA 91941

Resident
5333 Terra Granada Dr, 2A Entry 23
Walnut Creek, CA 94595

Celeste Hong
4758 Cromwell Ave
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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 # 2022030180

Project Title: Draft Recirculated EIR Carbon TerraVault I (Kern County) by California Resources Corporation (CRC)

Lead Agency: Kern County Planning and Natural Resources Department — Contact Person: Keith Alvidrez

Mailing Address: 2700 "M" Street Suite 100 — Phone: (661) 862-5015

City: Bakersfield — Zip: 93301 — County: Kern

Project Location: County: Kern — City/Nearest Community: City of Taft, Community of Buttonwillow

Cross Streets: Skyline Road and Elk Hills Road — Zip Code: 93251

Lat. / Long.: 35° 19.51567' N, 119° 31.11937' W — Total Acres: 9,104

Assessor's Parcel No.: Multi — Section: Multi — Twp.: Multi — Range: Multi — Base: MDB&M

Within 2 Miles: State Hwy #: 58 W — Waterways: California Aqueduct

Airports: Elk Hills – Buttonwillow Airport — Railways: N/A — Schools: N/A

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

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:

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational ____
☐ Recreational ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☒ Other: Carbon Capture and Storage and initial source

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
☒ Wildlife
☒ Growth Inducing
☒ Land Use
☒ Cumulative Effects
☒ Other GHG, Wildfire, Tribal Cultural Resources, Energy

Present Land Use/Zoning/General Plan Designation: Oil and Gas Exploration and Production/*Zoning:* A (Exclusive Agriculture); A-1 (Limited Agriculture)/*General Plan:* 8.3 (Extensive Agriculture); 8.3/2.1 (Extensive Agriculture & Seismic Hazard Overlay); 8.4 (Mineral and Petroleum); and 8.4/2.4 (Mineral and Petroleum & Steep Slope).

Project Description: A proposed CCS facility for permanent underground storage of up to 48 million tons of CO_2 in two reservoir formations on approximately 9,104 surface acres in the Elk Hills Oilfield in unincorporated Kern County and the related initial source for the capture of CO_2. The land acreages of the CCS Land Surface Area, which comprises the Conditional Use Permit being considered, has been reduced from the original 9,130 acres to 9, 104 acres through changes in the location of the facility onsite pipeline. The initial source of CO_2 is the pre-combustion oilfield gas from infield locations, including uses associated with the existing Elk Hills Power Plant. Maximum injection per year from future sources would be up to 2, 210,000 tons per year divided between the two formations (R-26 and A1-A-2). The facility consists of an underground pore space, approved by the EPA as the "area of review" where CO_2 will become permanently mineralized into rock, the CCS Surface Land Area over the underground storage area where limited uses will be permitted, approval of six (6) EPA Class VI UIC wells, conversion and creation of wells for CO_2 leak monitoring and seismic activity, approximately 11 miles of facility and injection underground pipeline for capture of pre-combustion gas, and the related infrastructure improvements for the capture, transfer, and permanent storage of CO_2.

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**".

S	Air Resources Board	S	Office of Emergency Services
	Boating & Waterways, Department of		Office of Historic Preservation
	California Highway Patrol	S	Office of Public School Construction
S	CalFire		Parks & Recreation
S	Caltrans District # 6		Pesticide Regulation, Department of
S	Caltrans Division of Aeronautics		Public Utilities Commission
	Caltrans Planning (Headquarters)	S	Regional WQCB # Central
	Central Valley Flood Protection Board	S	Resources Agency
	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	S	SWRCB: Water Quality
S	Energy Commission		SWRCB: Water Rights
S	Fish & Game Region # Fresno		Tahoe Regional Planning Agency
	Food & Agriculture, Department of	S	Toxic Substances Control, Department of
	General Services, Department of	S	Water Resources, Department of
	Health Services, Department of		
	Housing & Community Development		Other _____
	Integrated Waste Management Board		Other _____
S	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date June 4, 2024 Ending Date July 18, 2024

Lead Agency (Complete if applicable):

Consulting Firm: _____
Address: _____
City/State/Zip: _____
Contact: _____
Phone: _____

Applicant: _____
Address: _____
City/State/Zip: _____
Phone _____

Signature of Lead Agency Representative: /s/ **Date:** 6/4/2024

Keith Alvidrez, Planner II

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

Recirculated
Draft Environmental Impact Report

SCH# 2022030180

Volume 1

Chapters 1 – 12

CARBON TERRAVAULT I (KERN COUNTY)

by California Resources Corporation *(PP22405)*

Zone Change Case No. 5, Map No. 119
Zone Change Case No. 4, Map No. 120
Conditional Use Permit No. 13, Map No. 118
Conditional Use Permit No. 14, Map No. 118
Conditional Use Permit No. 5, Map No. 119
Conditional Use Permit No. 6, Map No. 119
Conditional Use Permit No. 3, Map No. 120
Conditional Use Permit No. 2, Map No. 138

Kern County
Planning and Natural Resources Department
Bakersfield, California

June 2024

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Chapter 1

Executive Summary

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Chapter 1

Executive Summary

1.1 Introduction

The Carbon TerraVault I (Kern County) Project (CTV I) proposed by California Resources Corporation (CRC, or project proponent) would request the approval of multiple Conditional Use Permits (CUPs) (CUP No. 13 Map No. 118, CUP No. 14 Map No. 118, CUP No. 5 Map 119, CUP No. 6 Map 119, CUP No. 3, Map 120, and CUP No. 2 Map No. 138) for the construction and operation of an approximately 9,104-acre carbon capture and storage (CCS) facility with related capture facilities and pipeline for the initial source and request associated Zone Change Case (ZCC) No. 5, Map 119 and ZCC No. 4, Map 120 from A-1 (Limited Agriculture) to A (Exclusive Agriculture) on approximately 6,160 acres. The facility consists of proposed U.S. Environmental Protection Agency (EPA) Class VI Underground Injection Control (UIC) wells, approximately 11 miles of underground facility and injection pipeline for capture from the pre-combustion gas, and related infrastructure improvements for the capture, transfer, and storage of carbon dioxide (CO_2).

The Draft Environmental Impact Report (EIR) has been prepared by Kern County as the Lead Agency under the California Environmental Quality Act (CEQA). The Draft EIR provides information about the environmental setting and impacts of the project and alternatives. It informs the public about the project and its impacts and provides information to meet the needs of local, State, and federal permitting agencies that are required to consider the project. The EIR will be used by Kern County to determine whether to approve the requested CUPs and associated changes in zoning designations.

This document is the Recirculated Draft EIR for the project proposed by CRC. This introduction provides background information concerning this document, explains how the changes made to the previous Draft EIR are shown, and describes the procedure for commenting on this Recirculated Draft EIR.

This Chapter 1, *Executive Summary*, summarizes the CEQA Statute and Guidelines, provides an overview of the project alternatives, identifies the purpose of this EIR, outlines the potential impacts of the project and the recommended mitigation measures, and discloses areas of controversy and issues to be resolved.

1.2 Project Summary

The process of CCS involves capturing carbon from the atmosphere or an emitting industrial facility and storing (sequestering) it underground (for example, in a depleted oil and gas field). Once injected, the CO_2 remains in the reservoir permanently due to the overlying Reef Ridge confining shale.

The source of CO_2 for injection as part of this project would be the pre-combustion Elk Hills field gas, from which CO_2 is captured and processed at the existing cryogenic and fractionation natural gas plant (CGP-1) facility and Elk Hills Power Plant within the Elk Hills oilfield (Elk Hills). No additional sources of CO_2 (from outside the Elk Hills gas field) or other new development are proposed for the CCS Surface Land Area or injection into the project. The captured CO_2 would then be transported by underground facility pipeline to the dedicated Class VI UIC wells for the project, all of which would be located within the CUP boundary. The CO_2 would be injected into the identified geographically confined reservoirs for permanent storage.

The project would be developed in two phases for capture site infrastructure, facility pipelines, and injection wells. A total of six Class VI UIC injection wells would be installed after EPA approval of the UIC – Class VI Permit.

Phase 1 wells (26R Reservoir) would consist of three new wells plus one modified existing well, and Phase 2 wells (A1A2 Reservoir) would consist of two modified Class II wells originally used for enhanced oil recovery. Ten existing wells would also be converted to monitoring wells, and six existing wells would be converted into seismic monitoring wells.

The proposed project at full operation is designed to capture up to 1.46 million tons of concentrated CO_2 in Section 26R during Phase 1, and up to 750,000 tons of concentrated CO_2 in Section A1A2 in Phase 2 for a total capacity of 2,210,000 tons for injection. As part of Phase 1, 101,743 tons per year (tpy) of compressed CO_2 will be injected, and as part of Phase 2, up to 101,743 tpy of compressed CO_2 will be injected, for a total of up to 203,485 tpy from the initial source-captured pre-combustion gas associated with Elk Hills.

1.2.1 Discretionary Entitlements Required

The Kern County Planning and Natural Resources Department as the Lead Agency (according to CEQA Guidelines Section 15052) for the proposed project has staff responsibility for the preparation of the EIR and recommendations to the decision makers on the proposed project. To implement this project, the project proponent may need to obtain discretionary and ministerial permits/approvals including, but not limited to, the following:

Federal

- EPA UIC – Class VI Permit
- U.S. Fish and Wildlife Service Section 10 Incidental Take Permit and Habitat Conservation Plan (if required)

State

- California Department of Fish and Wildlife
- Section 2081 Permit (State-listed endangered species) (if required)
- 401 Water Quality Certification Central Valley Regional Water Quality Control Board

- Waste Discharge Requirements
- National Pollution Discharge Elimination System Construction
- State Fire Marshal Approval of CO_2 Pipeline
- California Department of Conservation
- California Department of Conservation, Geologic Energy Management Division
- California Air Resources Board (CARB)
- Permit for Transport of Oversized Loads (if required)

Local

- Certification of Final EIR
- Adoption of 15091 Findings of Fact and 15093 Statement of Overriding Considerations
- Adoption of Mitigation Monitoring and Reporting Program
- Approval of Kern County ZCC No. 5, Map 119 and ZCC No. 4, Map 120 from A-1 (Limited Agriculture) to A (Exclusive Agriculture)
- Approval of Kern County CUP No. 13 Map No. 118, CUP No. 14 Map No. 118, CUP No. 5 Map 119, CUP No. 6 Map 119, CUP No. 3, Map 120, and CUP No. 2 Map No. 138
- Approval of Grading Permits
- Approval of Kern County Building Permits
- Approval of Kern County Encroachment Permits (if required)
- San Joaquin Valley Air Pollution Control District
  - Approval of Fugitive Dust Control Plan
  - Authority to Construct

Other applicable permits or approvals from responsible agencies may be required for the project.

1.3 Purpose And Use of the Draft Recirculated EIR

An EIR is a public informational document used in the planning and decision-making process. This project-level EIR analyzes the environmental impacts of the proposed project. The Kern County Planning Commission and Board of Supervisors will consider the information in the EIR, including public comments and staff responses to those comments, during the public hearing process. The final decision is made by the Kern County Board of Supervisors, who may approve, conditionally approve, or deny the project. The purpose of an EIR is to identify the following:

- The significant potential impacts of the Project on the environment, and indicate the manner in which those significant impacts can be avoided or mitigated

- Any unavoidable adverse impacts that cannot be mitigated
- Reasonable and feasible alternatives to the project that would eliminate any significant adverse environmental impacts or reduce the impacts to a less-than-significant level

An EIR also discloses growth-inducing impacts, impacts found not to be significant, and significant cumulative impacts of past, present, and reasonably anticipated future projects. CEQA requires preparation of an EIR that reflects the independent judgment of the Lead Agency regarding the impacts, the level of significance of the impacts both before and after mitigation, and mitigation measures proposed to reduce the impacts. A Draft EIR is circulated to Responsible Agencies, Trustee Agencies with resources affected by the project, and interested agencies and individuals. The purposes of public and agency review of a Draft EIR include sharing expertise, disclosing agency analyses, checking for accuracy, detecting omissions, discovering public concerns, and soliciting counterproposals. Reviewers of a Draft EIR are requested to focus on the sufficiency of the document in identifying and analyzing the possible impacts on the environment and ways in which the significant impacts of the project might be avoided or mitigated. Comments are most helpful when they suggest additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate significant environmental effects.

This Draft EIR is being distributed directly to agencies, organizations, and interested groups and persons for comment during a 45-day formal review period (exclusive of the County Winter Recess) in accordance with Section 15087 of the CEQA Guidelines. The EIR process, including means by which members of the public can comment on the EIR, is discussed further in Chapter 2, *Introduction*.

1.4 Project Overview

This section describes the local and regional setting, surrounding land uses, project objectives, and project characteristics. The project is described in further detail in Chapter 3, *Project Description*.

1.4.1 Regional Setting

The project area encompasses land in the Central Valley portion of the unincorporated area of Kern County, California. Elk Hills is located 26 miles southwest of Bakersfield in western unincorporated Kern County, California. The project is located on the west side of Elk Hills Road and north side of Skyline Road within Elk Hills. The surrounding area comprises agricultural fields, both active and fallow, and other existing oil fields, including the Midway/Sunset Oilfield, McKittrick Oilfield, and Cymric Oilfield. Skyline Road is closed to public entry and is the southern boundary of the project. Skyline Road connects to Elk Hills Road, which connects the town of Taft to the south, with Buttonwillow to the north. CRC's gated and guarded entrance to the field is located at the western intersection of Skyline Drive and Elk Hills Road.

The nearest urbanized areas to the boundary of the CCS Surface Land Area and Underground Approved Storage Area (pore space) for the project area are Bakersfield city center (approximately

26 miles), the city of Taft (approximately 8.5 miles), the unincorporated community of Tupman (approximately 5 miles), and the unincorporated community of Buttonwillow (approximately 4 miles). The closest community to the injection and capture facilities is McKittrick, 4.5 miles away. There are no residential structures within the boundary of the CUP CCS Surface Land Area. The project site is crossed by public utilities, including several Pacific Gas and Electric Company (PG&E) electric transmission lines over the eastern portion of the project site.

1.4.2 Surrounding Land Use and Project Site Conditions

The project site is located within Elk Hills, which comprises an approximately 75-square mile (47,800-acre) area used for oil and gas exploration and production. Table 3-2 in Chapter 3, *Project Description*, identifies the existing Land Use designations, Adopted General Plan Map Code Designations, and Existing Zoning of the project site and areas north, south, east, and west of the project site. Existing land use in the vicinity of the project site generally includes oil and gas exploration and production and agricultural lands. The closest sensitive receptor to the project site is McKittrick Elementary School, which is 4.47 miles southwest of the facility pipeline and injection well 357-7R. The nearest residence is approximately 4.4 miles southeast of the injection line and 4.4 miles from injection well 345-36R. Buttonwillow Recreation and Park District is approximately 7 miles northeast of injection well 355-7R and 6.9 miles from the injection pipeline. See Chapter 4.11, *Land Use and Planning*, for mapping and additional information.

1.4.3 Applicant-Provided Project Objectives

Section 15124(b) of the CEQA Guidelines requires a project description to include a statement of the objectives of a project that addresses the purpose. The following specific objectives have been identified by the project proponent for the proposed project:

- Construct and operate a permanent underground storage facility to develop and use existing CO_2 storage capacity at Elk Hills in an economically feasible manner.
- Contribute to CRC's adopted goals of Full-Scope Net Zero emissions for Scope 1 (direct greenhouse gas, or GHG, emissions), Scope 2 (indirect GHG emissions associated with the purchase of electricity/steam/heat/cooling) and Scope 3 (all other indirect GHG emissions resulting from the company's business operations) by 2045 by capturing and storing CO_2 emissions from CRC's Elk Hills field gas operations.
- Support California's Executive Order B-55-18 for California to achieve carbon neutrality by 2045 and net negative emissions thereafter.
- Site and design the project in an environmentally responsible manner consistent with current Kern County and California guidelines.
- Promote economic development and bring living-wage jobs to Kern County.

1.4.4 Project Characteristics

Project elements are shown on Figure 1-1 and include capture facilities, facility pipelines, and injection and monitoring wells (including seismic monitoring wells), which are described in detail in Chapter 3, *Project Description.*

Source of CO_2

The source of CO_2 for injection as part of this project (the initial source) would be Elk Hills field gas, which is captured and processed at the existing cryogenic and fractionation natural gas plant (CGP-1) facility constructed and operating at Elk Hills since 2013 along with the Elk Hills Power Plant. No additional sources of CO_2 or new development are proposed for the CCS Surface Land Area. Potential future additional sources of CO_2 are described in Chapter 3, *Project Description*.

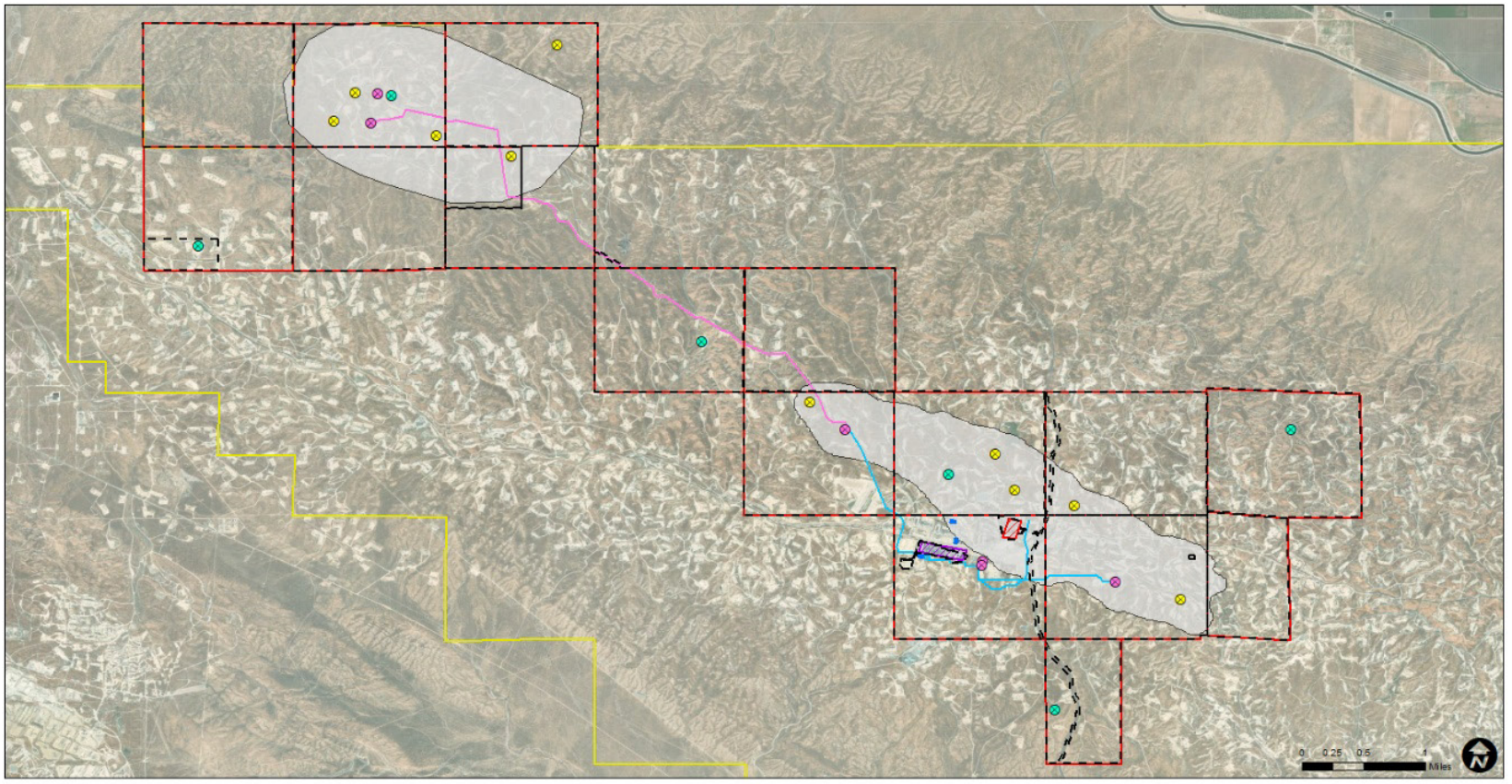
Two identical capture, compression, and pumping facilities would be constructed adjacent to the existing CGP-1 facility to capture up to 101,743 tpy of concentrated CO_2 in Phase 1 (up to 26 years) and 101,743 tpy of concentrated CO_2 in Phase 2 from the produced natural gas streams associated with Elk Hills field gas prior to processing in the CGP-1. There are five locations of natural gas collection, which tie in together in Section 26R just northwest of CGP-1, and then transported via an existing 20-inch line into the plant.

Capture Technology

The project proposes to use chemical solvents, specifically amine absorption, as the process of choice for this project. Amine treating is a critical process for enhancing the safety and reliability of natural gas by reducing its acid gas content. It employs reversible chemical reactions for the effective removal and recovery of CO_2 contaminants. Natural gas often contains contaminants such as hydrogen sulfide (H_2S) and CO_2, commonly termed "acid gases." These impurities not only pose health risks but also accelerate pipeline corrosion. To address this, natural gas is treated in Amine Plants to remove these acid gases.

The CO_2 would be separated from the Elk Hills gas stream using the technology of amine absorption. In the process, CO_2 is passed into an "absorber" unit where ionized CO_2 molecules dissolve into the amine solution. The CO_2-laden amine solution then passes into a "regenerator" that strips the CO_2 from the solution and recycles the amine for reuse in the absorber.

Figure 1-1: Site Plan



CO_2 Compression and Pumping Facilities

A compression facility would be required as part of each capture facility. The proposed compression facility would pressurize the CO_2 from a relatively low pressure up to roughly 1,700 to 2,100 pounds per square inch gauge for dense phase transport. The compressor station would be similar to natural gas compressor stations, including compressors, dehydration units, and heat exchangers.

Transport of CO_2: Facility Pipeline

In Phase 1, after compression, the CO_2 would be transferred through an up to 16-inch underground facility pipeline to the four injection wells within Section 26R. After installation of the up to 16-inch underground facility pipeline to the remaining two wells at A1A2 during Phase 2, the CO_2 would be transferred to the remaining two wells in A1A2. The injection pipeline and the facility pipelines would be newly designed and constructed underground to facilitate the transport of the CO_2 gas to the injection wells.

Approximately 5 miles of up to 16-inch facility pipeline would be installed underground for Phase 1, and approximately 6 miles of up to 16-inch facility pipeline would be installed for Phase 2. The majority of the facility pipeline would be collocated with existing pipelines along established rights-of-way. In sections where CO_2 would not be collocated, new existing sleepers would be installed prior to pipe placement. New sleeper locations would require boreholes approximately 8 inches in diameter. Drainages intersecting the pipeline route would be spanned. All facility pipelines would be covered in cathodic protection to prevent corrosion. After installation, the pipeline would be hydrotested to verify its integrity.

CO_2 Storage Sites

CO_2 captured at the sources previously described would be sent for disposal into six Class VI UIC wells in compliance with the EPA UIC program Class VI geologic storage regulations. The six wells would be implemented in two phases:

Phase 1: 26R (one converted, three new)

- Injection well - 26R (373-35R)
- Injection well - 26R (353X-35R)
- Injection well - 26R (345-36R)
- Injection well - 26R (363-27R)

Phase 2: A1A2 (conversion of two Class II wells used for oil recovery)

- Injection well - A1A2 (355-7R)
- Injection well - A1A2 (357-7R)

Injection Wells

The project would construct six injection wells – four (one converted, three new) proposed within Phase 1 (26R) and two (converted Class II wells used for oil recovery) within Phase 2 (A1A2). These injection facilities would require compression and/or pumping stations that would boost the pressure of the CO_2 up to the required injection pressure so it can be safely injected down an injection well. The injection facilities could include compressors, pumps, heat exchangers, chillers or coolers, tanks, water treatment, meters, and electrical and controls equipment among others. The height of each wellhead is approximately 12 feet, and the wellhead, cellar, incoming lines, and other equipment located around the wellhead would have a footprint of approximately 20 by 20 feet.

Monitoring Wells

There are 10 existing oil wells, no longer in operation, that the proposed project would convert to monitoring wells co-located next to the six injection wells. Monitoring activities would extend beyond the injection phase of the project pursuant to 40 Code of Federal Regulations (CFR) 146.93 until site closure is granted. Monitoring requirements during post-injection are similar to those during injection, with activities such as sampling occurring quarterly and monitoring well integrity testing at frequency according to EPA requirements. The project requires three monitoring wells for the Elk Hills A1A2 Approved Storage Space and three monitoring wells for the 26R Approved Storage Space. The EPA Class VI UIC permit shows the applicant intends to repurpose two existing wells for monitoring of both injection intervals and one above zone monitoring. Six existing oil wells in the project area, no longer in operation, would also be converted to seismic monitoring wells, as required by the California Integrated Seismic Network.

1.5 Environmental Impacts

CEQA Guidelines Section 15128 requires that an EIR contain a statement briefly indicating the reasons why any new and possibly significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR. The County has engaged the public to participate in the scoping of the environmental document.

The contents of this EIR were established based on a notice of preparation (NOP) prepared in accordance with the CEQA Guidelines and on public and agency input that was received during the scoping process. Comments received on the NOP are located in Appendix A of this EIR.

1.5.1 Impacts Not Further Considered in this EIR

Based on the findings of the NOP and the results of scoping, a determination was made that this EIR must contain a comprehensive analysis of all environmental issues identified in CEQA Guidelines Appendix G. No resource areas were eliminated from discussion through the Initial Study.

1.5.2 Impacts of the Project

Sections 4.1 through Section 4.20 in Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*, provide a detailed discussion of the environmental setting, impacts associated with the project, and mitigation measures designed to reduce significant impacts to less-than-significant levels when feasible. The impacts, mitigation measures, and residual impacts for the project are summarized in Table 1-3, located at the end of this chapter, and are discussed further in this subsection.

Impacts related to the following resource areas are evaluated in this EIR for their potential significance:

- Aesthetics and Visual Resources
- Agricultural and Forest 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
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

Environmental Effects Found To Be Less Than Significant

After further study and environmental review in this EIR, direct and indirect impacts of the project would be less than significant or could be reduced to less-than-significant levels with mitigation measures for the following issue areas:

- Aesthetics and Visual Resources
- Agricultural Resources
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning

- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation and Traffic
- Tribal Cultural Resources
- Utilities and Services
- Wildfire

Significant and Unavoidable Adverse Impacts

Section 15126.2(b) of the CEQA Guidelines requires that the EIR describe any significant impacts, including those that can be mitigated but not reduced to less-than-significant levels. Potential environmental effects of the proposed project and proposed mitigation measures are discussed in detail in Chapter 4 of this EIR.

As shown in Table1-1, impacts in the following areas would be significant and unavoidable, even with the incorporation of feasible mitigation measures.

Table 1-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
Aesthetics	There would be no significant and unavoidable project impacts	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on aesthetic and visual resources. Even with mitigation, the project has the potential to contribute to cumulative impacts within the region with the additions of the injection wells, monitoring wells, and capture facilities equipment. The cumulative impacts of the project when combined with other known and unknown projects are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Agricultural Resources	There would be no significant and unavoidable project impacts	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on agricultural resources. Because of the importance of the region's agricultural resources, the potential impacts related to the project's incremental contribution to the cumulative

Table 1-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
		farmland conversion would be cumulatively considerable. The cumulative impacts of the project when combined with other known and unknown projects are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Air Quality	The project's total emissions would exceed the San Joaquin Valley Air Pollution Control District thresholds for nitrogen oxides (NO_X), particulate matter with a diameter of 10 micrometers or less (PM_{10}), and particulate matter with a diameter of 2.5 micrometers or less ($PM_{2.5}$), for which the project region is nonattainment under an applicable federal or State ambient air quality standard. With the implementation of Mitigation Measure (MM) 4.3-1 and MM 4.3-8, the impact would remain **significant and unavoidable.**	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on air quality resources. Because the project's specific emissions would contribute to Kern County's 2020 emissions inventory and to the 2025 projected emissions of Kern County, the project's incremental effects on air quality would be cumulatively considerable and, even with mitigation, this potentially significant cumulative impact would be **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Biological Resources	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on biological resources. Although the cumulative impacts from CCS projects would be less because of the CCS Surface Land Use restrictions, other clean energy projects that are sited in the valley portion of Kern County have the potential to impact species and reduce habitats. The cumulative impacts of the project when combined with other known and unknown projects are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Cultural Resources	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on cultural resources. The project could contribute significantly to cumulative impacts on the potential to disturb human regions within the region. Although no human remains have been identified within the project site, to date, there is potential for their discovery

Table 1-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
		during project construction. The cumulative impacts of the project when combined with other known and unknown projects are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Energy	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on energy resources. The cumulative impacts on the regional grid, which have not been determined to meet the CARB 2045 goals for production, are **cumulatively significant and unavoidable** after all feasible and reasonable mitigation.
Geology and Soils	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on geologic resources. Because of the uncertainty of the implementation of multiple projects and the ability to simultaneously cease injection during a seismic event, the impacts from cumulative induced seismic activity from this project plus any future permitted CCS project are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Greenhouse Gases	The project has the potential to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment and conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. With the implementation of MM 4.8-1 and MM 4.8-2, the impact would remain **significant and unavoidable.**	The geographic scope for cumulative impacts for GHGs for the project is Elk Hills. Climate change impacts are inherently global and cumulative, and not project-specific. Although implementation of MM 4.8-1 and MM 4.8-2 would encourage reduction in GHG emissions at a regional level, they do not provide a mechanism that guarantees GHG emission reductions on a cumulative basis. The project's cumulative contribution to GHG emissions after implementation of the recommended mitigation measures would remain **cumulatively significant and unavoidable**.

Table 1-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
Hydrology and Water Quality	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on hydraulic resources as they relate to groundwater supply. The Kern County Subbasin is currently overdrawn and the West Kern Water District's Groundwater Sustainability Plan has been deemed inadequate, along with the other Kern subbasin plans where other similar known and unknown projects could occur. The cumulative impacts of any use of groundwater in the area are considered **cumulatively significant and unavoidable** after all feasible and reasonable mitigation.
Mineral Resources	The project could 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. Although MM 4.12-1 would require the project proponent to annually document the potential loss of oil, the loss of oil reservoir in the project area is considered a significant loss of oil, which is considered a mineral of value to the State. With the implementation of MM 4.12-1, impacts would remain **significant and unavoidable**.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on mineral resources. The loss of oil reservoir as part of the project is considered a significant loss of mineral resources. With the implementation of MM 4.12-1, the project's cumulative contribution would remain **significant and unavoidable**.
Noise	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative noise impacts. Since oil and gas activities could occur anywhere in the project area, the combined noise levels from the proposed project and existing or reasonably foreseeable projects depend on the proximity of oil and gas activities to other noise sources at a specific location. Noise generated from construction of wells authorized under the project, conservatively assuming use of the largest exploratory deep drilling rig (Kenai Rig), could be in excess of 65 dBA CNEL up to 4,000 feet from a construction site. Therefore, significant noise impacts would occur if there are sensitive noise receptors within 4,000 feet of the construction of a well. Other projects with construction or operations occurring

Table 1-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
		concurrently with construction or operations of a well would also contribute to noise levels experienced by nearby sensitive noise receptors. Although the project's cumulative contribution to noise is minor, cumulative impacts remain **significant and unavoidable**.
Utilities and Service Systems	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on utilities and service systems in regard to groundwater supply. As the Kern County Subbasin is currently overdrawn and the West Kern Water District's Groundwater Sustainability Plan has been deemed inadequate, along with the other Kern subbasin plans where the other similar known and unknown projects could occur, the cumulative impacts of any use of groundwater in the area are considered **cumulatively significant and unavoidable** after all feasible and reasonable mitigation.

Key:
CARB = California Air Resources Board
CCS = carbon capture and storage
GHG = greenhouse gas
MM = mitigation measure
NO_X = nitrogen oxides
PM = particulate matter
State = State of California

1.5.3 Significant Cumulative Impacts

According to Section 15355 of the CEQA Guidelines, the term cumulative impacts "refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Individual effects that may contribute to a cumulative impact may result from a single project or a number of separate projects. Individually, the impacts of a project may be relatively minor, but when considered along with impacts of other closely related or nearby projects, including newly proposed projects, the effects could be cumulatively considerable.

This EIR considers the potential cumulative effects of the proposed project. Impacts for the following issue areas have been found to be cumulatively considerable:

- Aesthetics and Visual Resources

- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gases
- Hydrology and Water Quality (Groundwater Supply)
- Mineral Resources
- Noise
- Utilities and Service Systems (Groundwater Supply)

Each of these significant cumulative impacts is discussed in the applicable sections of Chapter 4, *Environmental Settings, Impacts, and Mitigation Measures.*

1.5.4 Growth Inducement

The Kern County General Plan (KCGP) recognizes that certain forms of growth are beneficial, both economically and socially. CEQA Guidelines Section 15126.2(d) identifies a project as growth-inducing if it "would foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment."

Growth inducement can be a result of new development that requires an increase in employment levels, removes barriers to development, or provides resources that lead to secondary growth. With respect to employment, the project would not induce substantial growth. Construction staff who are not local would likely be housed in existing communities. Project operation would include five regular full-time employees and an additional five full-time employees could be on site at any time if repairs or other maintenance work is required. It is expected that some of these individuals would already reside in the area and operation of the project would not result in a substantial influx of people (such as a new residential development, school, or other use that would result in large volumes of people residing near or traveling to the project site). Therefore, the project is not likely to induce any growth within Kern County.

1.5.5 Energy Conservation

To ensure that energy implications are considered in project decisions, CEQA requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy (see Public Resources Code Section 21100(b)(3)). According to Appendix F of the CEQA Guidelines, the goal

of conserving energy implies the wise and efficient use of energy, including decreasing overall per capita energy consumption, decreasing reliance on natural gas and oil, and increasing reliance on renewable energy sources.

As discussed in Section 4.6, *Energy*, energy resources in the forms of diesel and gasoline fuel would be consumed by the use of off-road equipment and on-road vehicles during construction of the project. Temporary electricity may be required to provide as-necessary lighting and electric equipment. The amount of electricity used during construction would be minimal. Natural gas is not anticipated to be required during construction of the project. Overall, construction activities associated with the proposed project would result in the consumption of petroleum-based fuels. However, there are no unusual project characteristics that would necessitate the use of construction equipment or vehicles that would be less energy-efficient than those at comparable construction sites in other parts of the State of California (State). Therefore, it is expected that construction fuel consumption associated with the proposed project would not be any more inefficient, wasteful, or unnecessary than at other construction sites in the region.

During operation, most on-site equipment (e.g., pumps, maintenance, monitoring, or communications) for the pre-combustion oilfield gas would be powered by electricity from the Elk Hills Power Plant and supplemented by PG&E, as needed. Although the project would result in increased demand for energy resources, the energy would be consumed efficiently and would be typical of the current state of industrial carbon capture projects. Projections of energy use described in Section 4.6, *Energy*, for the total electricity needed for the project are based on the current technology (amine) and do not represent the newer forms of carbon capture, which include conservation measures to reduce the electric demand. Therefore, the projections are conservative and will be lower when other sources are permitted for injection into the project. As the State phases out oil and gas extraction and replaces gas power plants and fossil fuel industry sources with newer carbon capture facilities and renewable energy sources, such as solar (required for many forms of financing), the project would meet the requirements of Appendix F of the CEQA Guidelines.

The project would consume energy resources during construction and operations. Implementation of the project would support industrial operations that use renewable energy, decrease reliance on fossil fuels, including natural gas, and become more efficient in the use of electricity. The State's policies outlined in Senate Bill (SB) 905 and the ban on enhanced oil recovery with CO_2 ensure that the goals of Appendix F in sources for the injection will be more efficient.

1.5.6 Irreversible Impacts

Section 15126.2(c) of the CEQA Guidelines defines an irreversible impact as an impact that uses nonrenewable resources during the initial and continued phases of the project. Irreversible impacts can also result from damage caused by environmental accidents associated with a project. Irretrievable commitments of resources should be evaluated to ensure that such consumption is justified.

Build-out of the project would commit nonrenewable resources during project construction. During project operations, oil, gas, and other fossil fuels and nonrenewable resources would be consumed,

primarily in the form of transportation fuel for project employees. Therefore, an irreversible commitment of nonrenewable resources would occur as a result of long-term project operations. However, assuming that those commitments occur in accordance with the adopted goals, policies, and implementation measures of the KCGP as a matter of public policy, those commitments have been determined to be acceptable. The KCGP ensures that any irreversible environmental changes associated with those commitments will be minimized to the extent feasible.

1.6 Alternatives to the Proposed Project

Section 15126.6 of the CEQA Guidelines states that an EIR must address "a range of reasonable alternatives to the Project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the Project, and evaluate the comparative merits of the alternatives." Based on the significant and unavoidable impacts of the project, the aforementioned objectives established for the project, and the feasibility of the alternatives considered, a range of alternatives is analyzed in the next subsection and discussed in detail in Chapter 6, *Alternatives*, of this Draft EIR.

1.6.1 Alternatives Considered and Rejected

Kern County considered several alternatives to reduce the project's significant and unavoidable impacts. According to CEQA, the Lead Agency may make an initial determination as to which alternatives are feasible and warrant further consideration, and which are infeasible. The following alternatives were initially considered but were eliminated from further consideration in this EIR because they do not meet project objectives and/or were infeasible.

Drilling Ban on All Lands "Leave It in the Ground" Alternative

A drilling ban on all land would implement a "leave it in the ground" alternative. This alternative extends beyond denying or modifying the project to a policy decision to amend Chapter 19.98 the Zoning Ordinance to prohibit all oil and gas exploration, development, and production activities within the project area. Further, it would require that existing oil and gas wells and all facilities relying on that production and being considered for the CCS project would be required to cease, and all affected land would be required to be restored to its pre-exploration condition. This alternative assumes that the ban extends to the UIC Class VI wells needed for injection as well. An alternative in which another source not related to fossil fuel production is used for the CCS project, such as initial source direct air capture (DAC), is analyzed in Section 6.8.2, *Alternative 2 – Initial Source Direct Air Capture Alternative*. This alternative is outside the scope of the privately funded project under consideration and does not meet three out of the five project objectives. Further, the environmental impacts of construction activities to remove and restore land used for oil and gas exploration, extraction, and production by the industry in Kern County, encompassing over 596,199 acres for just the administrative oilfield, would exceed all the thresholds and project-specific impacts of this project in all categories. CEQA requires alternatives to reduce one or more impacts that are significant and unavoidable to less than significant. Although the production of various criteria pollutants and CO_2 from the use of the fuel would be reduced, the reduction would be offset

from the remediation activities. In addition to failing to meet most of the project objectives, an alternative that completely bans all new oil and gas exploration, development, and production activities is infeasible because of existing legal restrictions on the County's authority to prohibit access to subsurface mineral interests without liability. Since the Drilling Ban on All Lands Alternative is legally infeasible and would not achieve most of the project's basic objectives, and it is beyond the scope of the project and this EIR, it is rejected for analysis in this EIR.

Replacement of Elk Hills Power Plant with Renewable Energy

This alternative would involve the decommissioning of the Elk Hills Power Plant and replacing the 550 megawatts (MW) of electricity generated with a renewable source of energy. The Elk Hills Power Project is a nominal 550-megawatt natural gas-fired, combined-cycle, cogeneration power plant on 12 acres, certified by the California Energy Commission (CEC) on December 6, 2000. It began commercial operation on July 24, 2003. This alternative would address one of the project objectives; it would support California's Executive Order B-55-18 for California to achieve carbon neutrality by 2045 and net-negative emissions in years after 2045. It is, however, beyond the scope of this project for the County to exert regulatory control over the Elk Hills Power Plant and direct decommissioning. As a power plant producing power over 50 MW, it is under the complete authority of the CEC. The CEC and the California Public Utilities Commission are working on a long-term strategy by 2045 to decarbonize all California electricity, which includes the retirement of all natural gas power plants. Such a strategy, however, has not directed to-date retirement for the Elk Hills Power Plant. The EIR anticipates that, if permitted, the CCS underground capacity of 48 million tons and 2,210,000 tpy will, at some point, not include contributions from the Elk Hills Power Plant or oilfield gas sources but from other legally permitted off-site sources. Further, the replacement of 550 MW of gas-generated electricity, some of which is used for oilfield production with the remainder going to the PG&E distribution lines, would require an estimated 550 MW of commercial scale solar on at least 3,371 acres and a Battery Energy Storage System capable of storing up to approximately 4,000 megawatt-hours (MWh) of energy storage. Although the CO_2 generated in this scenario would be less than that generated by the Elk Hills Power Plant, the land use impacts and potential impacts on cultural, biological, and public services would be significant and unavoidable. Since the Replacement of the Elk Hills Power Plant with the Renewable Energy Alternative is legally infeasible and the County has no authority over the Elk Hills Power Plant, it would not achieve most of the project's basic objectives, and it is beyond the scope of the project and this EIR, it is rejected for analysis in this EIR.

Off-site Alternative

The Off-site Alternative would carry out the project in a different location, outside of the San Joaquin Air Basin. The project site, however, was selected because of its proximity to the location of oil and gas resources and infrastructure within the County. As explained in Chapter 3, *Project Description*, the project area was selected because it encompasses the portion of the County in which oil and gas development has historically occurred, as the process of CCS involves capturing carbon from existing point sources within an existing oil and gas field and storing it underground (for example, in a depleted oil and gas reservoir).

Furthermore, the selection of the project site was predicated upon the capacity of the preexisting infrastructure to effectively fulfill the project's objectives while limiting the impact on surrounding land use. All new CCS facilities, including wells, pipelines, and ancillary infrastructure, would be operated in areas in which oil and gas activity is currently the primary land use and therefore a compatible land use. There are also no established residential communities within or adjacent to the project area.

The Alternative would place the CCS facility outside the San Joaquin Air Basin to reduce the determination of significant and unavoidable impacts on air quality based on higher thresholds. The Mojave Air Basin, though in attainment for a number of criteria pollutants and therefore with higher thresholds, has no oil and gas production and therefore has no underground pore space suitable for a CCS project. Thus, this alternative is technically infeasible and it is therefore rejected for analysis.

It should also be noted that, although CEQA requires an EIR to identify project alternatives, it does not require the EIR to identify alternative project locations. According to the CEQA Guidelines, an EIR must include a reasonable range of "alternatives to the project, *or* to the location of the project" (14 California Code of Regulations [CCR] Section 15126.6(a), emphasis added). Applicable case law recognizes that CEQA grants Lead Agencies flexibility to elect to analyze either onsite or off-site alternatives, or both (see *Mira Mar Mobile Community* v. *City of Oceanside*, 119 California Fourth District Court of Appeal 447, 491 [2004]). There is no requirement under CEQA that an EIR always explore an off-site alternative (see *California Native Plant Society* v. *City of Santa Cruz*, 177 California Fourth District Court of Appeal 957, 933 [2009]). Thus, CEQA does not require this EIR to analyze the Off-site Alternative.

1.6.2 Alternatives Selected for Analysis

Alternatives that would avoid or substantially lessen any of the significant effects of the project and feasibly attain most of the basic project objectives are evaluated, below. The alternatives are discussed with respect to their relationship to the project's objectives. Kern County has considered the following two alternatives, which are also identified in Table 1-2 and discussed individually as follows:

- Alternative 1 – "No Project" Alternative
- Alternative 2 – Initial Source Direct Air Capture Alternative
- Alternative 3 – Nature-Based Carbon Storage Alternative

Alternative 1: "No Project" Alternative

As required by CEQA Guideline Section 15126.6, this chapter describes and analyzes a "no project" alternative for the purpose of comparing the impacts of approving the project with the impacts of not approving the project. Alternative 1, the No Project Alternative, thus assumes that the project's 9,130-acre CCS facility consisting of EPA Class VI UIC wells, approximately 13 miles of facility and injection pipeline for capture from the pre-combustion gas, and related infrastructure improvements for the capture, transfer, and storage of CO_2 would not be approved or

constructed. Accordingly, Alternative 1 assumes that the necessary approval of multiple CUPs to allow for the construction and operation of the CCS underground site installation of six Class VI UIC injection wells, conversion of 10 existing oil wells into monitoring wells, conversion of six existing oil wells into seismic wells, and construction of accessory infrastructure with a CO_2 storage capacity of 48 million metric tons within the A (Exclusive Agriculture) Zone District and related changes in zoning designations from A-1 (Limited Agriculture) to A (Exclusive Agriculture) would not be approved for project construction and operation.

Moreover, the No Project Alternative would not result in up to 2,210,000 million tpy of concentrated CO_2 storage capacity or inject up to 203,485 tpy of compressed CO_2. Therefore, the No Project Alternative would not contribute to the CRC's adopted goals of Full-Scope Net Zero emissions by 2045. The No Project Alternative also would not support California's Executive Order B-55-18 for California to achieve carbon neutrality by 2045 and net-negative emissions thereafter.

Finally, the No Project Alternative would maintain the current zoning, land use classifications, and existing land uses, which consist mostly of existing oil and gas exploration and production, including existing well pads, processing facilities, pipeline routes, and access roads, along with undeveloped desert vegetation. The project site would continue to be used for oil and gas extraction. The identified wells on schedule for abandonment under the project would not be abandoned early and would instead be abandoned on the 8-year idle well plan regulations.

Alternative 2 – Initial Source Direct Air Capture Alternative

Under Alternative 2, the project proponent would not capture the gas from the oilfield as the initial source but instead use a DAC system at an unknown location off site to capture atmospheric CO_2 emissions in place of a conventional amine-based capture system. DAC is a technology that captures CO_2 directly from the atmosphere, usually through a mechanical system, although some passive capture techniques are also being developed. In a mechanical system, fans or wind are used to drive ambient air through a contactor unit, in which the air passes across a chemical sorbent that selectively reacts with and traps CO_2, allowing the other components of the air to pass through and exit the system. Currently, the most developed adsorbent materials are in liquid or solid forms (Kern County Carbon Management Business Park – Report 2023, Appendix K-2).

DAC is an engineered equivalent to photosynthesizing plants, except that DAC captures CO_2 from the atmosphere at a faster rate and with a much smaller land footprint than biomass (a nature-based solution; refer to Alternative 3). Furthermore, DAC delivers CO_2 in a pure, compressed form. Captured atmospheric CO_2 can be permanently and safely stored in geologic reservoirs to deliver negative emissions or be used to produce low carbon intensity products, such as synthetic fuels that work in existing vehicles and infrastructure.

Current DAC technologies are primarily distinguished by using one of two types of sorbents: liquid solvents (L-DAC) and solid sorbents (S-DAC). In both techniques, DAC pulls air from the atmosphere and passes it over the sorbent material. The sorbent material captures the carbon dioxide, and the rest of the air passes through and exits the DAC unit. L-DAC typically uses hydroxide solutions (a liquid solvent) as the bonding sorbent, whereas S-DAC relies on a CO_2

"filter" or dry amine-based chemical sorbents. In both cases, the CO_2 from the air is chemically bound into a new compound, and then is subsequently broken down to release a high-purity stream of CO_2 for storage and the original sorbent components for reuse.

Both technologies require electricity and heat to operate; the electricity drives the fans and controls inlet systems, and the heat releases the trapped CO_2. However, S-DAC requires temperatures of only about 100 degrees Celsius (ºC) to break the chemical bonds linking the CO_2 to the sorbent material, whereas L-DAC requires temperatures around 900 ºC. Such temperatures are difficult to reach using renewable energy sources like wind or solar. If natural gas is used to attain the necessary heat, the associated CO_2 released from the use of L-DAC technology would need to be recaptured and stored to avoid counteracting the benefit of DAC.

Although the direct land footprint of DAC is smaller than that of alternative carbon removal processes, DAC requires renewable energy to operate, which results in large amounts of commercial scale solar. A DAC capable of generating 1 million tpy of CO_2 for injection would require over 1,600 acres of land and 228 MW of energy. This land use would be in addition to the 9,104 acres required for the carbon capture area.

DAC facilities are expected to produce zero or near-zero emissions on site that could be hazardous to the environment or human health. Hazardous waste is not a significant concern for DAC facilities.

Wastewater is also not generated in significant amounts in DAC processes, as the only water used is contained within closed-loop systems. Some DAC operations actually produce water as part of the process. Solid waste buildup can occur in the CO_2 recovery equipment, as happens in traditional monoethanolamine scrubbers that are used for point source carbon capture. Similar environmental regulation and disposal guidelines would need to be followed. Chemicals used in sorbent plants would degrade over time as heat is applied to release captured CO_2, but those degradation products (e.g., ammonia) are expected to be contained within the DAC plant and not released into the environment and have established regulation and disposal protocols.

L-DAC requires approximately 2.8 MWh of energy for every metric ton of CO_2 captured (estimates range from 1.8 to 3.7 MWh per metric ton of CO_2). Each L-DAC contactor unit captures about 300 to 600 metric tpy, and units are modular and stackable. Thus, footprints vary depending on how high units are stacked or how they are spread out. To capture 1 million metric tons of CO_2 per year, a facility would require an estimated 200 acres of space. Reported estimates range from 50 to 1,730 acres, depending on how contactor units are arranged.

Like the project, Alternative 2 would amend Zoning Ordinance Chapter 19.98 to rezone from A-1 to A for the carbon capture project and seek approval of the CCS facility with the initial source of a DAC facility. The Alternative also would require construction of injection and facility pipelines and injection and monitoring wells, just as would be required under the proposed project.

Alternative 3 – Nature-Based Carbon Storage Alternative

Alternative 3, the Nature-Based Carbon Storage Alternative, would replace the mechanical capture of CO_2 and storage in the underground oil and gas reservoir rock layer with the planting of trees or another type of appropriate crop in order to store atmospheric CO_2. Currently, the proposed project site is located in Elk Hills, an existing oil and gas field characterized by extensive oil and gas exploration and production, including existing well pads, processing facilities, pipeline routes, and access roads. Under this alternative, the project proponent would have to cease and remove all oil and gas exploration and production equipment within Elk Hills and then utilize the area for a nature-based carbon storage alternative. The most applicable nature-based carbon storage alternative for the area of the project site would be regenerative agriculture, as it coincides with the current zoning. Planting of trees would be one example of regenerative nature-based carbon storage for the highest ability to store atmospheric carbon. If 9,000 acres of the project site were remediated of all oil and gas facilities and prepared for planting, an estimated 400 to 1,000 trees per acre could be planted, resulting in a new forest area of 3.6 million to 9 million trees. The type of tree and planting configuration will affect the species selected. Characteristics of the best trees for carbon removal, instead of cover crops, include the use of fast-growing trees as they store the most carbon during the first decades of their lifespan and act as carbon sinks; trees with wide crowns and large leaves that are best for efficient photosynthesis; and the selection of native tree species that are compatible with local soil and disease-resistant trees that require no fertilizers.

Environmentally Superior Alternative

Identification of an environmentally superior alternative is required under CEQA (CCR Section 15126.6[e][2]). Alternative 1, the No Project Alternative, would be environmentally superior to the project on the basis of minimizing or avoiding physical environmental impacts, but it would have greater impacts on GHG emissions than would the project. Section 15126.6(e)(2) of the CEQA Guidelines states that if the No Project Alternative is found to be environmentally superior, "the EIR shall also identify an environmentally superior alternative among the other alternatives." Although Alternative 1 is the environmentally superior alternative relative to certain issue areas, it is not capable of meeting any of the project objectives. Because of its substantial reduction of impacts on GHG emissions and its ability to meet most of the project objectives, Alternative 2, Initial Source DAC, is considered the environmentally superior alternative.

Alternative 2 Initial Source – Direct Air Capture reduces the significant and unavoidable GHG emissions impacts of the project and would substantially reduce operational stationary source air emissions. This alternative would have greater impacts on aesthetics, biological resources, cultural resources, noise, and tribal cultural resources than the project would due to the larger footprint. Alternative 2 would continue to have significant and unavoidable impacts on mineral resources, and cumulative effects on agricultural and forest resources, air quality, geological resources, hydrology, and utilities, similar to the project. Although Alternative 1 would have fewer and less severe significant impacts than Alternative 2, Alternative 2 would achieve most of the project's objectives as described above.

Table 1-2: Summary Comparison of Alternative Impacts

Issue Area	Project Summary of Impacts	Alternative 1 No Project	Alternative 2 DAC Alternative	Alternative 3 Nature Based Carbon Storage Alternative
Aesthetics and Visual Resource	Less than significant	Less than project	Greater than project	Less than project
Agricultural and Forest Resources	Less than significant	Less than project	Greater than project	Same as project
Air Quality	Significant and Unavoidable	Less than project	Construction: Greater than project Operational: Less than project	Less than project
Biological Resources	Less than significant	Less than project	Greater than project	Same as project
Cultural Resources	Less than significant	Less than project	Greater than project	Same as project
Energy	Less than significant	Same as project	Same as project	Less than project
Geology and Soils	Less than significant	Less than project	Same as project	Less than project
Greenhouse Gas Emissions	Significant and unavoidable	Greater than project	Less than project	Less than project
Hazards and Hazardous Materials	Less than significant	Same as project	Same as project	Same as project
Hydrology and Water Quality	Less than significant	Less than project	Same as project	Less than project
Land Use and Planning	Less than significant	Same as project	Same as project	Same as project
Mineral Resources	Significant and unavoidable	Less than project	Same as the project	Same as the project
Noise	Less than significant	Same as project	Less than project	Less than project
Population and Housing	Less than significant	Same as project	Same as project	Less than project
Public Services	Less than significant	Less than project	Same as project	Less than project
Recreation	Less than significant	Same as project	Same as project	Less than project

Table 1-2: Summary Comparison of Alternative Impacts

Issue Area	Project Summary of Impacts	Alternative 1 No Project	Alternative 2 DAC Alternative	Alternative 3 Nature Based Carbon Storage Alternative
Transportation and Traffic	Less than significant	Same as project	Same as project	Less than project
Tribal Cultural Resources	Less than significant	Less than project	Greater than project	Less than project
Utilities and Service Systems	Less than significant	Less than project	Same as project	Greater than the project (water supply)
Wildfire	Less than significant	Same as project	Same as project	Greater than the project

1.7 Areas of Known Controversy

Areas of controversy were identified through written agency and public comments received during the scoping period. Public comments received during the scoping period are summarized in Chapter 2, *Introduction*, and provided in Appendix A. In summary, the following issues were identified during scoping and are addressed in the appropriate sections of Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*:

- Coordination and consultation with California Native tribes and compliance with Assembly Bill 52 and SB 18
- Special status species and rare biological resources present in the project area as well as federally listed species
- Evaluation of construction and operational emissions
- Air quality concerns for criteria pollutants and safety of operations
- Concerns about the use of CCS to capture greenhouse gas from fossil fuel sources

1.8 Issues to Be Resolved

Section 15123(b) (3) of the CEQA Guidelines requires that an EIR contain issues to be resolved, which include the choices among alternatives and whether or how to mitigate significant impacts. The major issues to be resolved regarding a project include decisions by the Lead Agency:

- Determine whether the Draft EIR adequately describes the environmental impacts of the project.
- Select a preferred choice among alternatives.
- Determine whether the recommended mitigation measures should be adopted or modified.
- Determine whether additional mitigation measures need to be applied to the project.

1.9 Summary of Environmental Impacts and Mitigation

Table 1-3, below, summarizes the environmental impacts of the project, mitigation measures, and unavoidable significant impacts identified and analyzed in Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*, of this EIR.

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Aesthetics				
Impact 4.1-1 Have a Substantial Adverse Effect on a Scenic Vista	Less than significant	No mitigation measures are proposed.	Less than significant	Less than significant
Impact 4.1-2 Substantially Damage Scenic Resources, including, but not limited to, Trees, Rock Outcroppings, and Historic Buildings within a State Scenic Highway	Less than significant	No mitigation measures are proposed.	Less than significant	Less than significant
Impact 4.1-3 Substantially Degrade the Existing Visual Character or Quality of the Site and its Surroundings	Potentially Significant	**MM 4.1-1** All derricks, boilers, and other drilling equipment used to drill, repair, clean out, deepen or redrill any well shall be removed from the drill site within 90 days after completion or after abandonment of any well. Earthen sumps used in drilling shall be filled within 90 days after any well has been placed in production (unless such sumps are to be used within six months for the drilling of another well), and any sump used in productions shall be filled after its abandonment and restored to a uniform grade within ninety days. **MM 4.1-2** Sumps and ponds shall be permitted only to the extent authorized by the Central Valley Regional Water Quality Control Board (via waiver, Waste Discharge Requirements, or other form of authorized written documentation) and shall comply with all applicable legal requirements and mitigation measures for sumps serving as storage, percolation or evaporation ponds for produced water. **MM 4.1-3** Project signage is limited to directional, warning, safety, security and identification signs in connection with oil, gas, or other hydrocarbon drilling and development operations in accordance with Chapter 19.84.135 of the Kern County Zoning Ordinance. **MM.4.1-4** Prior to issuance of a building, grading or implementation of an EPA permit to construct, a Project Boundary Signage Plan for the CCS Surface Land Area shall be submitted. The plan shall include the size and wording on signs that create virtual access to a map that shows the CCS Surface Land Area and notes the existence of a CO_2 Storage area underground. The sign shall also include a phone number and email. The plan shall include the spacing of the physical signage around the entire perimeter of the CCS Surface Land Area approved in the permit.	Less than significant	Significant and unavoidable
Impact 4.1-4 Create a New Source of Substantial Light or Glare that Would Adversely Affect Day or Nighttime Views in the Area	Potentially significant	**MM 4.1-5** All new lighting, including permanent nighttime lighting, safety, security, and operational lightening shall comply with the standards in Kern County Zoning Chapter 19.81 - Outdoor Lighting "Dark Sky Ordinance."	Less than significant	Less than significant
Impact 4.1-5 Contribute to Cumulative Aesthetic Impacts	Potentially Cumulatively considerable	Implement **MM 4.1-1** through **4.1-4**, as described above.	N/A	Significant and unavoidable

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Agricultural Resources				
Impact 4.2-1 Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to Non-Agricultural Use	Potentially significant	**MM 4.2.-1** Prior to any use of any portion of the CCS Surface Land Area for agricultural cultivation the CCS owner/operator shall provide the following for review and approval to the Planning and Natural Resources Department: A. A site plan showing the location of the agricultural operations within the CCS Surface Land Area that includes a written signed statement from the CCS owner/operator of the following requirements: 1. No activities are being authorized for the agricultural lease that would involve drilling of any water wells or other exploratory activities that would penetrate the confined cap layer to cause a leak. 2. No use of the buffer area around the injection well sites is included in any agricultural cultivation or related operations. 3. Acknowledgement that the farming operation has been informed and has a binding agreement to not conduct any activities near or in proximity to either the injection well sites or the capture facilities that would damage the fencing or equipment and a Worker Awareness Program for the farming employees of the use of the underground for CO_2 storage. 4. That any lease for agricultural cultivation is bound by all applicable requirements of the Carbon Terra Vault I (Kern County) CUP and EIR Mitigation Monitoring and Reporting Plan.	Less than Significant	Significant and unavoidable
Impact 4.2-2 Conflict with Existing Zoning For Agricultural Use or a Williamson Act Contract	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.2-3 Conflict with Existing Zoning for, or Cause Rezoning of, Forest Land or Timberland	No impact	No mitigation measures are required.	No impact	No impact
Impact 4.2-4 Result in the Loss of Forest Land or Conversion of Forest Land to Non-Forest Use	No impact	No mitigation measures are required.	No impact	No impact
Impact 4.2-5 Involve Other Changes in the Existing Environment Which, Because of 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	No mitigation measures are required.	No Impact	No impact
Impact 4.2-6 Result in the Cancellation of an Open Space Contract Made Pursuant to the California Land Conservation Act of 1965 or Farmland Security Zone Contract for Any Parcel of 100 or More Acres	No impact	No mitigation measures are required.	No impact	No impact

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Impact 4.2-7 Cumulative Impacts to Agricultural or Forest Resources	Potentially significant	Implement mitigation measure **MM 4.2-1**.	N/A	Significant and unavoidable
Air Quality				
Impact 4.3-1 Conflict With or Obstruct Implementation of the Applicable Air Quality Plan	Potentially significant	**MM 4.3-1** Consistent with the requirements of the San Joaquin Valley Air Pollution Control District Regulation II-Permits, the Owner/operator shall obtain an Authority to Construct permit and a Permit to Operate for any facility or equipment requiring a permit from the San Joaquin Valley Air Pollution Control District, such as stationary sources required to obtain permits pursuant to District Rule 2010. All emissions increases from permitted equipment shall comply with District Rule 2201. **MM 4.3-2** The Owner/operator shall develop and implement a Fugitive Dust Control Plan in compliance with San Joaquin Valley Air Pollution Control District fugitive dust suppression regulations. The Fugitive Dust Control Plan shall include: a. Name(s), address(es), and phone number(s) of person(s) responsible for the preparation, submission, and implementation of the plan. b. Description and location of operation(s). c. Listing of all fugitive dust emissions sources included in the operation. d. The following dust control measures shall be implemented: 1. All onsite unpaved roads shall be effectively stabilized using water or chemical soil stabilizers that can be determined to be as efficient as or more efficient for fugitive dust control than California Air Resources Board approved soil stabilizers, and that shall not increase any other environmental impacts including loss of vegetation. 2. All material excavated or graded will be watered to prevent excessive dust. Watering will occur as needed with complete coverage of disturbed areas. The excavated soil piles will be watered as needed to limit dust emissions to less than 20% opacity or covered with temporary coverings. 3. Construction activities that occur on unpaved surfaces will be discontinued during windy conditions when winds exceed 25 miles per hour and those activities cause visible dust plumes that exceed the SJVAPCD 20% opacity standard. 4. Track-out debris onto public paved roads shall not extend 50 feet or more from an active operation and track-out shall be removed or isolated such as behind a locked gate at the conclusion of each workday, except on agricultural fields where speeds are limited to 15 mph. 5. All hauling materials should be moist while being loaded into dump trucks. 6. All haul trucks hauling soil, sand, and other loose materials on public roads shall be covered (e.g., with tarps or other enclosures that would reduce fugitive dust emissions). 7. Soil loads should be kept below 6 inches or the freeboard of the truck. 8. Drop heights when loaders dump soil into trucks shall not exceed 5 feet above the truck. 9. Gate seals should be tight on dump trucks. 10. Traffic speeds on unpaved roads shall be limited to 25 miles per hour. 11. All grading activities shall be suspended when visible dust emissions exceed 20%.	Less than significant	Significant and unavoidable

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		12. Other fugitive dust control measures as necessary to comply with San Joaquin Valley Air Pollution Control District Rules and Regulations. 13. Disturbed areas shall not exceed those shown on the Site Plan. 14. Disturbed areas should be re-vegetated as soon as possible after disturbance if area is no longer needed for oil and gas activities. **MM 4.3-3** All off-road construction diesel engines not registered under California Air Resources Board's Statewide Portable Equipment Registration Program, which have a rating of 50 horsepower or more, shall meet, at a minimum, the Tier 3 California Emission Standards for Off-road Compression-Ignition Engines as specified in California Code of Regulations, Title 13, section 2423(b)(1) unless that such engine is not available for a particular item of equipment. In the event a Tier 3 engine is not available for any off-road engine larger than 100 horsepower, that engine shall be equipped with retrofit controls that would provide nitrogen oxides and particulate matter emissions that are equivalent to Tier 3 engine. a. All equipment shall be turned off when not in use. Engine idling of all equipment shall be limited to five minutes, except under exemptions specified in California Code of Regulations Title 13 Section 2449(d)(2)(A). b. All equipment engines shall be maintained in good operating condition and in proper tune per manufacturers' specifications. **MM 4.3-4** To further reduce emissions of oxides of nitrogen from on-road heavy-duty diesel haul vehicles: a. 2007 engines or pre-2007 engines shall comply with California Air Resources Board retrofit requirements set forth in California Code of Regulations Title 13 Section 2025. b. All on-road construction vehicles, except those meeting the 2007/California Air Resources Board-certified Level 3 diesel emissions controls, shall meet all applicable California on-road emission standards and shall be licensed in the State of California. This does not apply to worker personal vehicles. c. All on-road construction vehicles shall be properly tuned and maintained in accordance with the manufacturers' specifications.		
Impact 4.3-2 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	Potentially significant	**MM 4.3-5** Prior to issuance of any grading or construction permits the Owner/Operator shall enter into an Developer Mitigation Agreement (DMA) with the San Joaquin Valley Air Pollution Control District. The DMA is to mitigation criteria emissions of the CCS project implementation , not required to be offset under a District rule as described in MM 4.3-1, and for Project vehicle and other mobile source emissions. The Owner/operator shall pay fees to fully offset Project emissions of NOx (oxides of nitrogen), ROG (reactive organic gases), PM10 (particulate matter of 10 microns or less in diameter), and PM2.5 (particulate matter of 2.5 microns or less in diameter) (including as applicable mitigating for reactive organic gases by additive reductions of particulate matter of 10 microns or less in diameter) (collectively, "designated criteria emissions") to avoid any net increase in these pollutants. The air quality mitigation fee shall further be paid prior to the approval of any construction or grading approval and shall be used to reduce designated criteria emissions to fully offset Project emissions that are not otherwise required to be fully offset by District permit rules and regulations. a. Examples of feasible air emission reduction activities that may be funded by air quality fees paid by Owner/operator or proposed and implemented by the Owner/operator under the emission reduction agreement include, but are not limited to, the following: 1. Replacing or retrofitting diesel-powered stationary equipment such as motors on generators, pumps and wells with electric or other lower-emission engines that are not subject to Title V reductions. 2. Replacing or retrofitting diesel-powered school, transit, municipal and other community mobile sources such as buses, car fleets, and maintenance equipment, with electric or other lower-emission engines.	Significant and unavoidable	Significant and unavoidable

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		3. Reducing emissions from public infrastructure sources such as water and wastewater treatment and conveyance facilities and reducing water-related emissions through water conservation and reclamation. 4. Funding lower-emission equipment and processes for local businesses, schools, non-profit and religious institutions, hospitals, city and county facilities, including EV Charging facilities and electric vehicle transportation options for the selected communities. b. Under the legislative requirements of Section 39741.1 of the California Health and Safety Code all funding shall be used in disadvantaged communities near the CCS project. Unincorporated communities and incorporated cities within a 20 mile radius, measured from the corners of the CCS Surface Land Area are eligible for the use of the funding for qualified projects and shall be known as " Eligible CCS Air Funding Communities ". No funding shall be used outside those areas. c. The owner/ operator shall provide an annual payment of $ 140,000 to the Kern County Planning and Natural Resources Department for the creation of a county managed community liaison position to provide technical support to the Eligible CCS Air Funding Communities and coordination with the San Joaquin Valley Air Pollution Control District to expedite use of the funding for air mitigation projects. The first payment shall be made 30 days after approval of the Developer Mitigation Agreement by the SJVAPCD. Annual payments shall be made by January 31 in the following years until final closure of the CO_2 injection activities. d. The Agreement shall be reviewed by the California Air Resources Board for compliance with requirements of Section 39741.1 of the California Health and Safety Code before execution and adoption.		
Impact 4.3-3 Expose Sensitive Receptors to Substantial Pollutant Concentrations	Potentially significant	The project shall be required to implement **MM 4.7-1, MM 4.9-9,** and **MM 4.9-10** relative to risks of exposure to CO_2 from pipeline rupture. Furthermore, the project would be required to comply with the following mitigation measure for sensitive receptors. **MM 4.3-6** No Class VI or Class II injection well for use in this CCS project shall be located within 4000 feet of any sensitive receptor. **MM 4.3-7** The following measures shall be implemented to address Valley Fever and pandemics: A. Project shall include in the Worker Environmental Awareness Program information on how to recognize the symptoms of Valley Fever and to promptly report suspected symptoms of work-related Valley Fever to a supervisor. A Valley Fever informational handout shall be provided to all onsite construction personnel. The handout shall, at a minimum, provide information regarding the symptoms, health effects, preventative measures, and treatment. Additional information and handouts can be obtained by contacting the Kern County Public Health Services Department. Onsite personnel shall be trained on the proper use of personal protective equipment, including respiratory equipment. National Institute for Occupational Safety and Health (NIOSH)-approved respirators shall be provided to onsite personal, upon request as part of the Worker Environmental Awareness Training Program. B. A payment of $3500 shall be made to the Kern County Public Health Services Department for the specific purposes of continued Valley Fever education and outreach. C. Owner/operators shall implement all orders related to the COVID-19 pandemic or any other pandemic mandated by Kern County Public Health on well sites and related to worker safety. **MM 4.3-8** Prior to issuance of any construction or grading permits, the Owner/operator shall consult with the San Joaquin Valley Air Pollution Control District and develop a draft Air Monitoring program for fence line monitoring of all air constituents generated by the CCS project including but not limited to: criteria pollutants, CO_2, and H_2S. The plan shall be reviewed and approved by both the San Joaquin Valley Air District and the California Air Resources Board, with a draft copy to the EPA UIC Program and Kern County Planning and Natural Resources, and implemented before any construction on	Significant and unavoidable	Significant and unavoidable

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		the CCS facilities can occur. The final approved plan shall be provided to the EPA UIC Program and Kern County Planning and Natural Resources. **MM 4.3-9** Prior to issuance of any grading or construction permits, the Owner/Operator shall comply with all requirements of the State of California requirements under Section 39741.1 of the California Health and Safety Code. Mitigation Measures that are more restrictive than the final adopted State Framework shall be implemented and cannot be waived by the State Carbon Framework determinations and must be implemented.		
Impact 4.3-4 Result in Other Emissions Such as Those Leading to Odors Adversely Affecting a Substantial Number of People	No impact	No mitigation measures are required.	No impact	No impact
Impact 4.3-5 Result in Other Cumulatively Considerable Air Quality Impacts	Potentially significant	Implement **MM 4.3-1** through **MM 4.3-9**, as described above.	N/A	Significant and unavoidable
Biological Resources				
Impact 4.4-1 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 Wildlife or the United States Fish and Wildlife Service	Potentially significant	**MM 4.4-1** The following are requirements for all grading and construction activities on all project components in the defined disturbance area, including all injection wells, abandonment of wells, capture facilities and pipelines. The remaining CCS Surface Land Area that is within the project boundary but has no construction or disturbance is not subject to this requirement. **A. Qualifications:** The Owner/operator shall use a qualified biologist for all work on reports submitted for any application for project permit. The qualified biologist must have a Bachelor of Science Degree or Bachelor of Arts Degree in biology or related environmental science, have demonstrated familiarity with the natural history, habitat affinities and identification of Covered Species of the San Joaquin Valley and have conducted work in California for at least one (1) year of field level reconnaissance survey work in the San Joaquin Valley. The resume of the biologist preparing any report submitted for permits shall be included in the report. Lack of these specific qualifications will result in immediate rejection of the report without further review. **B. Protocol Surveys:** Based on the information gathered from the biological reconnaissance survey and any informal consultation with United States Fish and Wildlife Service and California Department of Fish and Wildlife, any required focused/protocol surveys shall be conducted by a qualified biologist consistent with protocol study timelines in advance of submittal of the permit application to determine the presence/absence of sensitive species protected by state and federal Endangered Species Acts and potential project impacts to those species. The survey shall be conducted in accordance with the most current standard protocol of the United States Fish and Wildlife Service and California Department of Fish and Wildlife. The purpose of focused/protocol surveys is to confirm the presence or absence of any species listed as threatened or endangered under the federal Endangered Species Act. Threatened or endangered under the California Endangered Species Act, rare or endangered in the California Native Plant Protection Act or designated as fully protected in the California Fish and Game Code (collectively, "Protected Species"), and to confirm the presence or absence of any other species considered "sensitive" under California Environmental Quality Act ("Sensitive Species"), and to identify and implement avoidance and minimization measures for such species. The surveys shall be conducted in accordance with all currently applicable presence and absence survey and/or species protocols established by the United States Fish and Wildlife Service and the California Department of Fish and Wildlife ("Species Protocols"). In the absence of any approved protocols, the survey shall extend for a minimum of 250 feet from all areas where any ground disturbance activities would occur, provided that permission to access has been obtained.	Less than significant	Significant and unavoidable

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative

As an alternative to individual pre-disturbance surveys for each application, and after consultation with and concurrence by the California Department of Fish and 'Wildlife and the United States Fish and Wildlife Service, multiple parcels or areas of CCS activities (including lands which may have multiple surface or mineral ownership) may be consolidated for the purpose of more efficiently managing pre-disturbance surveys and determinations regarding the absence of protected species in areas of proposed new ground disturbance activities.

C. **Monitoring:** A biological monitor with the same qualifications as a qualified biologist shall be present during ground-disturbing activities in project locations that have special-status species habitat or are adjacent to potential special-status species habitat. Within 30 days before any ground-disturbing activities in special-status species habitat, the qualified biologist shall conduct a pre-disturbance survey to record existing conditions of the site, determine if conditions have changed since the reconnaissance or focused/protocol surveys were conducted, and to determine where sensitive species avoidance buffers will be established.

MM 4.4-2 **Take Authorization:** No incidental take of any species listed as threatened or endangered under the federal Endangered Species Act, threatened or endangered under the California Endangered Species Act, rare or endangered in the California Native Plant Protection Act, or designated as fully-protected in the California Fish and Game Code (Protected Species) may occur unless the incidental take is authorized by applicable state and federal wildlife agencies in the **form of a permit or other written authorization**, an approved state or federal conservation plan, or in accordance with an approved regional plan such as the Draft Valley Floor Habitat Conservation Plan and/or Natural Community Conservation Plan.

MM 4.4-3 **Buffers:** Protective buffers shall be used, where effective in the opinion of the qualified biologist, to avoid any unauthorized incidental take of Protected Species, and to minimize any incidental take of Sensitive Species, by separating the planned disturbance area from any locations where the qualified biologist has detected the presence of Protected Species or Sensitive Species. Protective buffers shall be delineated using brightly colored stakes and/or flagging or similar materials and remain until construction activities are complete, at which time of completion the buffers must be removed. Protective buffers, as shown in Table 4.4-6, shall be established around active dens and/or burrows of special-status animal species, or populations of special-status plant species to avoid unauthorized take of protected species as listed in Table 4.4-6. The protective buffer distance shall be increased if required to avoid unauthorized incidental take of any Protected Species as determined by a qualified biologist. Protective buffer distances and other avoidance measures that may be implemented to avoid impacts to Protected Species or Sensitive Species must be consistent with the United States Fish and Wildlife Service and/or the California Department of Fish and Wildlife and shall be implemented and overseen by the qualified biologist.

Table 4.4-6: Disturbance Buffers for Sensitive Resources

Sensitive Resource	Buffer Zone from Disturbance (feet)
Potential San Joaquin kit fox den	50
Known San Joaquin kit fox den	100
Natal San Joaquin kit fox den	500
Atypical San Joaquin kit fox den	50
Rodent burrows and small mammal burrows	50
Listed bird species active nests	0.5 mile
Burrowing owl burrow (breeding and non-breeding season)	Pursuant to California Department of Fish & Wildlife guideline
San Joaquin coachwhip, all legless lizards, coast horned lizard	30
American badger:	
Non-maternity dens	50
Maternity dens	200
Crotch's bumble bee	50
Special-status plants	50

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

<table>
<tr><th>Impact</th><th>Level of Significance before Mitigation</th><th>Mitigation Measure(s)</th><th>Level of Significance Project</th><th>Level Cumulative</th></tr>
<tr><td></td><td></td><td>
MM 4.4-4 Occupied burrowing owl burrows shall not be disturbed during the species nesting season (February 1 through August 31). The following distances shall be maintained between all disturbance areas and burrowing owl nesting sites (Table 4.4-6).

Burrowing owls present in proposed disturbance areas or within 500 feet or as specified under an approved Habitat Conservation Plan (as identified during pre-disturbance surveys) outside of the breeding season (between September 1 and January 31) may be moved away from the disturbance area using passive relocation techniques approved by the California Department of Fish and Wildlife. Passive relocation techniques in the California Department of Fish and Wildlife Staff Report on Burrowing Owl Mitigation Guidelines include installing one-way doors in burrow entrances for 48 hours, to ensure the owl(s) have left the burrow, daily monitoring during the passive relocation period, and collapsing existing burrows to prevent reoccupation. A minimum of one or more weeks will be required to relocate the owl(s) and allow for acclimatization to alternate off-site burrows. Prior to burrow exclusion or eviction, a burrowing owl management plan shall be prepared and approved by the California Department of Fish and Wildlife. Destruction of burrows shall occur only pursuant to a management plan for the species approved by the California Department of Fish and Wildlife; burrow excavation shall be conducted by hand whenever possible.

Table 4.4-6: Setback Distances for Burrowing Owl Nesting Sites by Level of Proposed Project Impacts
<table>
<tr><td colspan="3">Location</td></tr>
<tr><td>Nesting sites</td><td>Nesting sites</td><td>Nesting sites</td></tr>
<tr><td colspan="3">Time of Year</td></tr>
<tr><td>April 1–Aug 15</td><td>Aug 16–Oct 15</td><td>Oct 16–Mar 31</td></tr>
<tr><td colspan="3">Project Impact Level</td></tr>
<tr><td colspan="3">Low</td></tr>
<tr><td>656 feet (200 meters)</td><td>656 feet (200 meters)</td><td>164 feet (50 meters)</td></tr>
<tr><td colspan="3">Medium</td></tr>
<tr><td>1,640 feet (500 meters)</td><td>656 feet (200 meters)</td><td>328 feet (100 meters)</td></tr>
<tr><td colspan="3">High</td></tr>
<tr><td>1,640 feet (500 meters)</td><td>1,640 feet (500 meters)</td><td>1,640 feet (500 meters)</td></tr>
</table>
As an alternative to passive relocation, occupied burrows identified off-site within 500 feet of construction activities may be buffered with hay bales, fencing (e.g., sheltering in place), or as directed by the qualified biologist and the California Department of Fish and Wildlife, to avoid disturbance of burrows.

MM 4.4-5 The following are requirements for any and all grading and construction activities on all project components, including all injection wells, abandonment of wells, capture facilities and pipelines:

a. The qualified biologist surveys shall determine whether active bat maternity roosts are located in or within 250 feet of any disturbance area. All active bat maternity roosts shall be avoided during breeding periods, including postponing disturbance activities. If an active Sensitive or Protected Species bat maternity roost location is proposed to be disturbed, the qualified biologist shall consult with, the United States Fish and Wildlife Service and California Department of Fish and Wildlife to identify any additional minimalization measures which the qualified biologist determines with the wildlife agencies can actually be implemented based on field conditions. All such measures must be implemented for project activities.

b. The qualified biologist surveys shall determine if there is any plants that would be disturbed that provide habitat for Crotch’s bumblebee. If such habitat is determined that appropriate surveys shall be required after consultation with California Department of Fish and Wildlife.
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Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)		Level of Significance Project	Level Cumulative
		MM 4.4-6	Any potential San Joaquin kit fox dens (as defined in United States Fish and Wildlife Service 2011) detected during reconnaissance or focused/protocol surveys shall be reevaluated by the qualified biologist for species activity no more than 30 days prior to the commencement of ground disturbance in the required pre-construction survey. Potential kit fox dens shall be marked, and a 50-foot avoidance buffer shall be delineated using brightly colored stakes and flagging or similar materials to prevent inadvertent damage to the potential den. If the qualified biologist determines that an unoccupied potential den cannot be avoided, the den may be hand excavated in accordance with the United States Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance (United States Fish and Wildlife Service 2011). If species activity is detected, the location shall be identified as a "known" kit fox den in accordance with the U.S. Fish and Wildlife Service species guidelines (United States Fish and Wildlife Service 2011). A minimum 100-foot buffer from any disturbance area shall be maintained for known dens and a minimum 500-foot buffer from any disturbance area shall be maintained for natal dens. No excavation of a known or natal den shall occur without prior authorization from the United States Fish and Wildlife Service and the California Department of Fish and Wildlife. For activities occurring on land covered under an approved federal and/or State incidental take authorization, the requirements set forth in those documents shall be implemented. Other standard measures to protect San Joaquin kit fox, including capping pipes, covering trenches, adding exit ramps to excavated areas, shall be implemented in accordance with **MM 4.4-15.**		
		MM 4.4-7	Occupied American badger dens detected during pre-disturbance surveys shall be flagged and ground-disturbing activities avoided within 50 feet of the den. Maternity dens shall be avoided and a minimum 200-foot buffer from disturbance shall be maintained during pup-rearing season (February 15 through July 1). Maternity dens must be avoided to the maximum extent feasible in the opinion of the qualified biologist. If an active maternity den is proposed to be disturbed, the qualified biologist, shall consult with the California Department of Fish and Wildlife to identify any appropriate additional minimization measures which the qualified biologist determines, with the wildlife agencies, can actually be implemented based on field conditions. All such measures must be implemented for project activities.		
		MM 4.4-8	Pre-disturbance surveys for active bird nests must be conducted no more than 10 days prior to the commencement of disturbance. Surveys shall follow United States Fish and Wildlife and California Department of Fish and Wildlife guidance and/or protocols, as applicable. If no active nests or nesting birds are identified, then project construction activities may proceed and no further mitigation measures for nesting birds are required. If active nest(s) are identified, the active nest(s) should be continuously surveyed for the first 24 hours after detection, to establish a behavioral baseline prior to any construction-related activities. Once construction commences, all nests shall be continuously monitored to detect any behavioral changes as a result of the project (i.e., nest avoidance or abandonment). If behavioral changes are observed, the work causing that change shall cease until the Owner/operator qualified biologist consults with the California Department of Fish and Wildlife and the United States Fish and Wildlife and the qualified biologist used by the Owner/operator implements the recommended measures. During such times as the qualified biological monitor is not onsite while construction workers are onsite, a minimum non-disturbance buffer of 250 feet shall be established around active nests and a 500-foot no-disturbance buffer around the nests of raptors 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, and any adult birds are no longer occupying the nest. Deviations from these no disturbance buffers may be implemented if the qualified biologist concludes that work within the buffer area would not cause nest avoidance or abandonment (e.g., when the disturbance area would be concealed from a nest site by topography) provided that notification of this determination of a deviation in the no-disturbance buffer is provided by the qualified biologist no less than 15 days in advance to the California Department of Fish and Wildlife and the United States Fish and Wildlife.		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		MM 4.4-9 The following measures will be implemented to avoid take of blunt-nosed leopard lizard and to ensure protection of these animals during project activities: a) Project activities will avoid all potential burrows that may be occupied by blunt-nosed leopard lizards. Suitable burrows within and adjacent to potential habitat for the species should be avoided by a minimum distance of 50-feet in all areas where ground-disturbing project activities will occur. b) No more than one year prior to ground disturbing activities, focused surveys following current California Department of Fish and Wildlife and United States Fish and Wildlife protocols for detection of this species or other methods approved by both agencies shall be conducted in all potential blunt-nosed leopard lizard habitat within the work site and a 250-foot buffer area. If no individual blunt-nosed leopard lizards are observed during focused surveys, and surveys are current (e.g., completed in the same calendar year), then project activities may proceed. c) If blunt-nosed leopard lizards are detected during focused surveys, a blunt-nosed leopard lizard avoidance plan shall be prepared for the project that will result in avoidance of incidental take of this species unless take is separately authorized under a Natural Communities Conservation Plan and appropriate federal authorization is obtained. At a minimum, the blunt-nosed leopard lizard avoidance plan shall be provided to the California Department of Fish and Wildlife and the County, and shall contain the following elements: 1. A Worker Environmental Awareness Program shall be implemented for all construction personnel before construction begins. 2. During periods that are optimal for blunt-nosed leopard lizard activity (early spring through late fall), a qualified biologist will be present during all ground disturbing activities. The qualified biologist will check the project site(s) and access route(s) daily during the blunt-nosed leopard lizard active season to determine presence or absence of lizards in or near the work areas. Monitoring by a qualified biologist is not required during periods of inactivity (the winter season). 3. All open trenches or excavations shall be covered at the end of each workday or protected with the use of exclusion fencing to prevent wildlife entrapment. If an excavation is too large to cover, escape ramps shall be installed at an incline ratio of no greater than 2:1. All trenches and pipes shall be inspected for the presence of wildlife each day prior to the commencement of work. If blunt-nosed leopard lizards are observed at the work site during construction, construction shall cease within a 250-foot radius and the United States Fish and Wildlife Service and the California Department of Fish and Wildlife shall be consulted to determine what additional measures would be necessary to prevent take of this species. 4. Offsite locations where blunt-nosed leopard lizards have been observed or are likely to occur shall be clearly marked to prevent workers from driving off the road and to prevent inadvertent destruction of burrows. Barriers, such as exclusionary fencing may be installed. All construction equipment and construction personnel vehicles will be checked prior to moving to ensure no blunt-nosed leopard lizard are under equipment/vehicles. 5. A speed limit of 10 miles per hour shall be posted and observed within 0.25 miles of any reported blunt-nosed leopard lizard observation. 6. Construction activities shall avoid burrows that may be used by blunt-nosed leopard lizards. Any location of proposed construction activity with potential to collapse or block burrows (i.e., stockpile storage, parking areas, staging areas, trenches) will be identified prior to construction in the blunt-nosed leopard lizard avoidance plan and approved by the qualified biologist. The qualified biologist may allow certain activities in burrow areas if the combination of soil hardness and activity impact is not expected to collapse burrows and no blunt-nosed leopard lizards have been found during pre-project surveys in the impact area.		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

<table>
<tr><th>Impact</th><th>Level of Significance before Mitigation</th><th>Mitigation Measure(s)</th><th>Level of Significance Project</th><th>Level Cumulative</th></tr>
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7. All individual blunt-nosed leopard lizards observed above-ground will be avoided. Any individual blunt-nosed leopard lizard that may enter the project site(s) would be allowed to leave unobstructed, and on its own accord. If a blunt-nosed leopard lizard is detected during biological monitoring or observed at any other point, the California Department of Fish and Wildlife and the United States Fish and Wildlife Service shall be notified to determine what additional measures would be necessary to prevent take of the species.

MM 4.4-10 The Owner/operator shall comply with the following for any and all grading and construction activities on all project components, including all injection wells, abandonment of wells, capture facilities and pipelines.

a. Prior to ground disturbance plant surveys for Protected Species and Sensitive Species must be completed by a qualified biologist during the appropriate blooming periods for species identification and detection (as shown in Table 4.4-7). Plant surveys shall be conducted in accordance with all applicable protocols established by the United States Fish and Wildlife Service and the California Department of Fish and Wildlife for particular plant species ("Plant Survey Protocol") and shall extend 50 feet from areas where any new disturbance would occur unless a greater survey distance is specified in the Plant Survey Protocol.

All detected plant populations of Protected Species and Sensitive Species shall be identified in the field during the surveys with temporary flags or other visible materials to avoid and minimize impacts to the plant populations from any disturbance activities.

Table 4.4-7: Blooming Period of Special-Status Plants with Potential to Occur
<table>
<tr><th>Special-Status Plant Species</th><th>Optimal Blooming Period</th></tr>
<tr><td>Heart scale
(Atriplex cordulata var. cordulata)</td><td>April – October</td></tr>
<tr><td>Lost Hills crownscale
(Atriplex coronata S. Watson var. vallicola)</td><td>April – September</td></tr>
<tr><td>California jewelflower
(Caulanthus californicus)</td><td>February – May</td></tr>
<tr><td>Recurved larkspur
(Delphinium recurvatum)</td><td>March – June</td></tr>
<tr><td>Kern mallow
(Eremalche kernensis)</td><td>February/March – May</td></tr>
<tr><td>Temblor buckwheat
(Eriogonum temblorense)</td><td>April/May – September</td></tr>
<tr><td>Tejon poppy
(Eschscholzia lemmonii ssp. kernensis)</td><td>February/March – May</td></tr>
<tr><td>Showy golden madia
(Madia radiata)</td><td>March – May</td></tr>
<tr><td>San Joaquin woollythreds
(Monolopia congdonii)</td><td>February – May</td></tr>
<tr><td>Oil neststraw
(Stylocline citroleum)</td><td>March – April</td></tr>
</table>
b. No incidental take or relocation of any plant listed under the federal Endangered Species Act, the California Endangered Species Act, or the California Native Plant Protection Act may occur unless the incidental take is authorized by the United States Fish and Wildlife Service and/or the California Department of Fish and Wildlife in a permit or other authorization, or in an approved Habitat Conservation Plan or Natural Communities Conservation
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</table>

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		Plan. If focused plan surveys detect the presence of any listed plant, the plant populations shall be buffered from disturbance activities by implementing applicable impact avoidance protocols established by the United States Fish and Wildlife Service and/or the California Department of Fish and Wildlife unless incidental take authority is obtained. Projects covered under incidental take authority shall conduct activities in accordance with the take authorization. The qualified biologist may consult with the California Department of Fish and Wildlife to determine the recommended buffer distances required to prevent incidental take of a listed plant if avoidance protocols have not been established for the species. The qualified biologist shall confirm that all applicable listed plant buffers have been implemented prior to the commencement of any disturbance activity. All compensation for habitat loss shall be as determined through consultation with the wildlife agencies. c. Sensitive species plant populations which are not Protected Species that may be impacted by new ground disturbing activities must be avoided by a 50-foot buffer, as delineated and implemented by a qualified biologist used by the Owner/operator. **MM 4.4-11** A Worker Environmental Awareness Program shall be developed and implemented for all personnel that could access the site prior to commencing any disturbance activities. The program shall consist of an on-site or center presentation that will describe the locations and types of sensitive plant, wildlife, and sensitive natural communities (collectively, "Biological Resources") on and near the site, an overview of the laws and regulations governing the protection of Biological Resources, the reasons for protecting the Biological Resources, the specific protection and avoidance measures that are applicable to the site, and the identity of designated points of contact should questions or issues arise, including the qualified biologist. The program shall provide training to recognize, avoid and report to applicable qualified biologists any Biological Resources on the site. a. The Worker Environmental Awareness Program shall emphasize the need to avoid contact with onsite wildlife and avoid entry into areas where Biological Resources have been identified based on pre-disturbance field surveys and to implement the buffer avoidance or other protection measures established by the United States Fish and Wildlife Service shall be identified California Department of Fish and Wildlife or required by the Biological Resource mitigation measures. The training shall emphasize the importance of not feeding or domesticating wildlife and the need to avoid any trash, micro trash, or potential food disposal onsite except in animal-proof containers emptied daily to avoid attracting or causing adverse impacts to special status wildlife. b. All onsite personnel must sign a statement verifying that they have completed the Worker Environmental Awareness Program, and that they understand and agree to implement the biological requirements for the worksite. If signed employee statements are not available, documentation may be provided by Worker Environmental Awareness Program training records, which shall be kept by the Owner/operator for a minimum of 5 years. Each Owner/operator shall maintain a list of all persons who have completed the training program and shall provide the list to the County or to state and federal wildlife agency representatives upon request. **MM 4.4-12** After construction, but before operation of any Class VI Injection well for the CCS project, a 500-foot wildlife protection buffer setback from the edge of the well pad shall be established and fenced to prevent wildlife from accessing the site. The qualified biologist shall conduct full clearance surveys before any fencing installation and monitor the installation. Reasonable measures shall be used by the Owner/Operator when servicing the well to control the site to ensure that gates are not left open such that wildlife are permitted to enter. The qualified biologist shall create a protocol for the workers to implement to review the site before closing the gate to ensure not wildlife are trapped inside and for allowing for the escape of any wildlife that does inadvertently enter the fenced buffer area. Any wildlife found that might have been affected by exposure to CO_2 shall immediately cause a shutdown of all injection operations, compliance with all requirements of the EPA Class VI UIC permit and onsite consultant with California Fish and Game and United States Fish and Wildlife Service		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		MM 4.4-13 The following additional measures shall be implemented to avoid and minimize potential significant adverse impacts to Protected and Sensitive Species: a. All vehicles shall observe a 20-mile-per-hour speed limit in all areas of disturbance and on unpaved roads unless otherwise posted. Off-road traffic outside of designated access routes is prohibited. Speed limit signs shall be posted in visible locations at the point of site entry and at regular intervals on all unpaved access roads. b. All disturbance activities, except emergency situations or drilling that may require continuous operations, shall only occur during daylight hours. Nighttime disturbance activity for drilling purposes shall use directed lighting, shielding methods, and comply with applicable lighting mitigation measures. c. All food-related trash items and all forms of micro trash, such as wrappers, cans, bottles, bottle tops, and food scraps shall be disposed of in closed, animal proof containers and removed daily from the site. d. Excavations, spoils piles, access roadways, and parking and staging areas shall subject to dust control as set forth in the dust control mitigation measures. e. The use of herbicides for vegetation control shall be restricted to those approved by the United States Fish and Wildlife Service and the California Department of Fish and Wildlife. No rodenticides shall be used on any site unless approved by the United States Fish and Wildlife Service, and the California Department of Fish and Wildlife, and shall observe label and other restrictions mandated by the United States Environmental Protection Agency, California Department of Food and Agriculture, and state and federal laws and regulations. For split estates, no herbicides for vegetation control may occur in Tier 2 areas without surface owner approval. f. No plants or wildlife shall be collected, taken, or removed from the site or any adjacent locations except as necessary for project-related vegetation removal or wildlife relocation by a qualified biologist and subject to all applicable permits and authorizations. g. All open trenches or excavations shall be covered at the end of each workday to prevent wildlife entrapment. If an excavation is too large to cover, escape ramps shall be installed at an incline ratio of no greater than 2:1. All trenches and pipes shall be inspected for the presence of wildlife each day prior to the commencement of work. h. To enable San Joaquin kit foxes and other wildlife to pass through the project site, any perimeter fencing shall include a 4- to 8-inch opening between the fence mesh and the ground, or the fence shall be raised 4 inches above the ground except blunt-nosed leopard lizard exclusion fencing. The bottom of the fence fabric shall be knuckled (wrapped back to form a smooth edge) to protect wildlife. i. All vertical tubes used in project construction and chain link fencing poles, shall be temporarily or permanently capped to avoid the entrapment and death of special-status wildlife and birds. All pipes 1.5 inches or greater in diameter stored overnight on a project location must have end caps or other physical barriers that prevent wildlife from entering the pipe. wildlife. j. All dead or injured special status wildlife shall be left in place and reported to the United States Fish and Wildlife Service and the California Department of Fish and Wildlife within 48 hours of discovery for rescue or salvage. Discovery of state or federal listed species that are injured, or dead shall also be managed consistent with regulatory requirements, including being reported immediately via telephone and within 24 hours in writing, and with a copy to Kern County Planning and Natural Resources. k. All drilling installations and operations will comply at all times with the applicable federal, State, county, and local law ordinances and regulations. 1. During pre-construction surveys, the qualified biologist shall delineate previously disturbed areas to be used by the Owner/operator to minimize the amount of new disturbance.		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		m. All concrete and asphalt debris should be removed from the site for recycling or disposal at an authorized, permitted facility. n. No vehicles or construction equipment shall be parked within a wetland or waterbody/dry wash. o. Tracked vehicles and other construction equipment must be washed or maintained to be weed-free prior to entering and working within areas of new disturbance. p. All washing of trucks, paint, equipment, or similar activities should occur in areas where runoff is fully contained for collection and offsite disposal. Wash water may not be discharged from the site and shall be located at least 100 feet from any water body, or sensitive Biological Resources. q. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries or waterbody, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. r. All areas that must be avoided as result of the pre-disturbance surveys, and areas where new disturbance will occur, shall be clearly delineated by fencing or staking and flagging and/or rope or cord. s. No firearms shall be allowed on any site. t. No pets shall be allowed on any site. u. No smoking may occur except in designated areas. **MM 4.4-14** The following additional measures shall be implemented to avoid and minimize potential significant adverse impacts to temblor legless lizard: a. Protocol/focused and pre-disturbance surveys shall be conducted using a CDFW-approved methodology to determine the presence of temblor legless lizard at and/or near the Project area. b. If temblor legless lizards are detected during protocol/focused surveys, a temblor legless lizard avoidance plan shall be prepared for the project that will result in avoidance of incidental take. At a minimum, the temblor legless lizard avoidance plan shall be submitted for approval to the California Department of Fish and Wildlife and the County. c. In the event that complete avoidance of the temblor legless lizard is not feasible, MM 4.4-2 shall be implemented. **MM 4.4-15** The following additional measures shall be implemented to avoid and minimize potential significant adverse impacts to Crotch's bumble bee: a. Protocol/focused surveys for crotch's bumble bee and its requisite habitat features shall be conducted by a qualified biologist during the blooming period immediately prior to Project construction following the methodology outlined in the Survey Considerations for California Endangered Species Act Candidate Bumble Bee Species (CDFW 2023). b. If Crotch's bumble bee is detected during biological monitoring or observed at any point, the California Department of Fish and Wildlife and the United States Fish and Wildlife Service shall be notified to determine what additional measures would be necessary to prevent take of the species. c. In the event that complete avoidance of Crotch's bumble bee is not feasible, MM 4.4-2 shall be implemented.		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Impact 4.4-2 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 Wildlife or the United States Fish and Wildlife Service	Potentially significant	**MM 4.4-16** Pre-disturbance surveys shall be conducted by a qualified biologist during the appropriate periods for detecting Sensitive Natural Communities that could occur within the Project Area. The surveys shall be completed consistent with applicable protocols approved by the United States Fish and Wildlife Service and/or the California Department of Fish and Wildlife, including the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009). The qualified person shall map and identify all sensitive natural communities, including riparian communities that occur in or within 100 feet of any new disturbance area. The site plan for the proposed activity shall identify waters, wetlands, resources subject to section 1600 of the CFGC, and other riparian habitats that occur in and within 100 feet of the disturbance area. **MM 4.4-17** No land disturbance activity in any Sensitive Natural Community that requires a state or federal permit, including state or federally regulated wetlands and waters, shall occur unless the activity is specifically authorized by the issuance of permits or approvals as required by state and federal law. This provision is not intended to restrict survey activities or restrict permit approvals for such disturbance activities. However, no new wells, tanks, sumps or ponds shall be constructed within 50 feet of federal or state waters or wetlands.	Less than significant	Significant and unavoidable
Impact 4.4-3 Have a Substantial Adverse Effect on Federally Protected Wetlands as Defined by Section 404 of the Clean Water Act (Including, but Not Limited to, Marsh, Vernal Pool, Coastal, etc.) through Direct Removal, Filling, Hydrological Interruption, or Other Means	Potentially significant	Implement **MM 4.4-16** through **MM 4.4-17**.	Less than significant	Significant and unavoidable
Impact 4.4-4 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	Potentially significant	Implement **MM 4.4-1, MM 4.4-3, MM 4.4-8, MM 4.4-11,** and **MM 4.4-13.**	Less than significant	Significant and unavoidable
Impact 4.4-5 Conflict with Any Local Policies or Ordinances Protecting Biological Resources, Such as a Tree Preservation Policy or Ordinance	No impact	No mitigation measures are required.	No impact	No impact
Impact 4.4-6 Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local, Regional, or State Habitat Conservation Plan	Potentially significant	Implement **MM 4.4-2.**	Less than significant	Significant and unavoidable
Impact 4.4-7 Cumulative Impact to Biological Resources	Potentially significant	Implement **MM 4.4-1** through **MM 4.4-17**, as described above.	N/A	Significant and unavoidable

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Cultural Resources				
Impact 4.5-1 Cause a Substantial Adverse Change in the Significance of a Historical Resource as Defined in Section 15064.5	Potentially significant	**MM 4.5-1** The following are requirements for any and all grading and construction activities on all project components with defined ground disturbance, including all injection wells, abandonment of wells, capture facilities and pipelines. The remaining CCS Surface Land Area that is within the project boundary but has no construction or disturbance is not subject to this requirement. a. The Owner/operator shall demonstrate whether the project site has been previously surveyed for cultural resources. The Owner/operator may rely on a previously performed ground surface survey for subsequent ground disturbing activities. If the project site has not been previously surveyed based on the records search information, an intensive (100%) pedestrian ground-surface survey (Phase I survey/Class III inventory) by qualified archaeologists shall be required. If no cultural resources have been recorded, then no further cultural resources studies shall be required. b. All prehistoric/Native American archaeological sites, whether identified during the records searches or during the intensive survey, shall be demarcated by a qualified archaeologist, fenced by the Owner/operator, and preserved in place. c. Should it be determined that preservation in place is not achievable, then historical (Euro-American) archaeological sites that are potentially eligible for listing in the National Register of Historic Places (NRHP) and/or California Register of Historic Resources (CRHR) shall be evaluated by a qualified archaeologist or historian and must meet the requirements of the National Historic Preservation Act of 1966 and/or California PRC 5024.1; 14 CCR Section 15064.5[a][3] in order to qualify. Qualifying sites, structures and equipment that are identified during the records search or field survey shall be fenced and preserved in open space, removed and curated, or treated using data recovery procedures that follow the guidelines of the Secretary of the Interiors Standards for Architectural and Engineering Documentation. d. Historical (Euro-American) archaeological site types relating to oil and gas activities that have been determined Not Significant/Unique shall require no archaeological study or treatment. e. All employees conducting work in the area identified on the CCS final design plans shall complete Worker Environmental Awareness Program training including training dedicated to cultural resources protection. f. Qualified Native American Tribal monitors shall be retained from a Kern County Federally recognized tribe for all construction activities. The Tribe may elect to delegate this employment to other Tribes in the area. All monitors must have completed safety training for oilfield worker as well as the Worker Awareness Program. Written documentation from the Tribe on the monitors and completed training shall be provided to the Kern County Planning and Natural Resources Department.	Less than significant	Significant and unavoidable
Impact 4.5-2 Cause a Substantial Adverse Change in the Significance of an Archaeological Resource as Defined in Section 15064.5	Potentially significant	In addition to **MM 4.5-1** previously identified, **MM 4.5-2** would be incorporated. **MM 4.5-2** In the event archaeological materials are encountered during the course of ground disturbance or construction, the project operator/contractor shall cease any ground disturbing activities within 500 feet of the find or as needed to preserve the site. The qualified archaeologist shall evaluate the significance of the resources and recommend treatment measures. Per California Environmental Quality Act Guidelines Section 15126.4(b)(3), project redesign and preservation in place shall be the preferred means to avoid impacts to significant historical resources. Consistent with California Environmental Quality Act Guidelines Section 15126.4(b)(3)(C), if it is demonstrated that resources cannot be avoided, the qualified archaeologist shall develop additional treatment measures in consultation with the County, which may include data recovery or other measures. The Planning and Natural Resources Department shall consult with Native American representatives in determining treatment for unearthed cultural resources if the resources are prehistoric or Native American in nature. If after consultation it is determined that archaeological materials are to be recovered, then they shall be curated at an accredited curation facility. The qualified archaeologist shall prepare a report documenting evaluation	Less than significant	Significant and unavoidable

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		and/or additional treatment of the resource. A copy of the report shall be provided to the Kern County Planning and Natural Resources Department and to the Southern San Joaquin Valley Information Center.		
Impact 4.5-3 Disturb any Human Remains, including those Interred outside of Formal Cemeteries	Potentially significant	**MM 4.5-3** If human remains are uncovered during project construction, the Owner/operator shall immediately halt all work on the site, contact the Kern County Coroner to evaluate the remains, and follow the procedures and protocols set forth in Section 15064.5 (e)(1) of the California Environmental Quality Act Guidelines. The Kern County Planning and Natural Resources Department shall be notified concurrently. If the County Coroner determines that the remains are Native American, the project proponent shall contact the Native American Heritage Commission, in accordance with Health and Safety Code Section 7050.5, subdivision (c), and Public Resources Code 5097.98 (as amended by Assembly Bill 2641). The Native American Heritage Commission shall designate a Most Likely Descendant for the remains per Public Resources Code 5097.98. Per Public Resources Code 5097.98, the Owner/operator , in coordination with the landowner, shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the discussion and conference with the Most Likely Descendant has occurred, if applicable, taking into account the possibility of multiple human remains. If the remains are determined to be neither of forensic value to the Coroner, nor of Native American origin, provisions of the California Health and Safety Code (7100 et. seq.) directing identification of the next-of-kin will apply. In the event human remains are uncovered, the surface owner shall be notified immediately.	Less than significant	Significant and unavoidable
Impact 4.5-4 Contribute to Cumulative Cultural Resources Impacts	Potentially significant	Implement **MM 4.5-1** through **MM 4.5-3**.	N/A	Significant and unavoidable
Energy				
Impact 4.6-1 Project would result in potentially significant environmental impact due to wasteful, inefficient or unnecessary consumption of energy resources during project construction or operation	Less than significant	No mitigation measures are required.	Less than significant	Significant and unavoidable
Impact 4.6-2 The project would conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.6-3 Contribute to Cumulative Energy Impacts	Potentially significant	**MM 4.6-1** The operator shall provide an annual report on the total amount of electricity consumed by the carbon capture facilities associated with sources that send CO_2 for injection into the project storage site. The report shall detail the facility the source of the power and the annual amount. The report shall include a discussion of modifications that are being considered by each source to reduce electricity use. The first report is due the 13th month after the first month injection commences. The report shall be provided to the Kern County Planning and Natural Resources Agency, EPA UIC Permit Division, California Air Resources Board, California Public Utilities Commission, California Energy Commission, and California Independent System Operators.	N/A	Significant and unavoidable

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Geology and Soils				
Impact 4.7-1 Directly or Indirectly Cause Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving the 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 based on other substantial evidence of a known fault	Potentially significant	**MM 4.7 1** The owner/operator shall prepare a comprehensive seismic activity monitoring plan that includes, but is not limited to, connection to the Statewide seismic monitoring program of California Seismic Network (CISN). The draft plan shall be submitted concurrently to all the following agencies: Environmental Protection Agency, Region 9, California Seismic Network, California Air Resources Board and Kern County Public Works and Kern County Planning and Natural Resources. The final plan shall be approved by the California Air Resources Board and include all requirements of State law including but not limited to: Appropriate subsurface monitoring to ensure geologic sequestration of injected carbon dioxide; Identification of hazards and conditions that may require the suspension of carbon dioxide injections; notification protocols for all applicable agencies and emergency procedures. All requirements for seismic monitoring adopted by the California Air Resources Board – "Carbon Capture, Removal, Utilization and Storage Program" shall be implemented.	Less than significant	Significant and unavoidable
Impact 4.7-2 Directly or Indirectly Cause Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving Strong Seismic Ground Shaking	Potentially significant	Implement **MM 4.7-1.**	Less than significant	Significant and unavoidable
Impact 4.7-3 Directly or Indirectly Cause to Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving Seismic-Related Ground Failure, Including Liquefaction	Potentially significant	Implement **MM 4.7-1.**	Less than significant	Significant and unavoidable
Impact 4.7-4 Directly or Indirectly Cause Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving Landslides	Potentially significant	**MM 4.7-2** Operators shall not site wells or accessory equipment and facilities on slopes greater than 30%.	Less than significant	Less than significant
Impact 4.7-5 Result in Substantial Soil Erosion or the Loss of Topsoil	Potentially significant	Implement stormwater mitigation measures, as described in Section 4.10, Hydrology and Water Quality.	Less than significant	Less than significant
Impact 4.7-6 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	Potentially significant	**MM 4.7-3** The Owner/operator shall implement all requirements of a site-specific geotechnical report.	Less than significant	Less than significant
Impact 4.7-7 Be Located on Expansive Soil, as Defined in Table 18-1-B of the Uniform Building Code (1994), Creating Substantial Risks to Life or Property	Potentially significant	**MM 4.7-4** The Owner/operators shall avoid building infrastructure on expansive soil, unless the Owner/operator determines that CCS injection facilities are infeasible from a different location, and site-specific Professional Engineering certification is submitted concluding that the new equipment will not cause substantial risks to life or property. The site-specific professional engineering certification must be submitted and reviewed by the Kern County Public Works Department and a memo provided that agrees that construction and operation of new equipment will not cause substantial risks to life or property as determined through established engineering standards. All recommendations required by the approved engineering certification from Kern County Public Works shall be implemented.	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Impact 4.7-8 Have Soils Incapable of Adequately Supporting the Use of Septic Tanks or Alternative Wastewater Disposal Systems Where Sewers Are Not Available for the Disposal of Wastewater	No impact	No mitigation measures are required.	No impact	No impact
Impact 4.7-9 Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature, as defined in CEQA Guidelines Section 15064	Potentially significant	**MM 4.7-5** As part of any Worker Environmental Awareness Program training, all construction personnel shall be trained regarding the recognition of possible uncovered paleontological resources and protection of paleontological resources during construction, prior to the initiation of construction or ground-disturbing activities. Training shall inform construction personnel of the procedures to be followed upon the discovery of paleontological materials. All personnel shall be instructed that unauthorized collection or disturbance of fossils is unlawful. **MM 4.7-6** Prior to commencement of any work on project wells, capture facilities or facility pipeline a mitigation fee of $ 1000 shall be paid to the Buena Vista Museum to fund the continued education and curation of paleontological resources and provide educational support regarding the paleontological history of the region.	Less than significant	Less than significant
Impact 4.7-10 Contribute to Cumulative Geologic and Soils Impacts	Potentially significant	Implement **MM 4.7-1** through **MM 4.7-6.**	N/A	Significant and unavoidable
Greenhouse Gas Emissions				
Impact 4.8-1 Generate Greenhouse Gas Emissions, Either Directly Or Indirectly, that may have a Significant Impact on the Environment	Potentially significant	**MM 4.8-1** Prior to any injection of CO_2 the owner/operator shall submit a monitoring plan that complies with all requirements of the EPA UIC permit issued for the project to demonstrate the retention of CO_2 in the injection/hydrocarbon reservoir zone. The plan shall be submitted to the Kern County Planning and Natural Resources Department concurrent with submittal to the EPA for review. A copy of the final approved plan from the EPA shall be provided to the Kern County Planning and Natural Resources Department. **MM 4.8-2** The owner/operator shall submit to the Kern County Planning and Natural Resources Department a quarterly report on the amount of CO_2 injected into the CCS project, and the source of the CO_2. The reports shall be filed no later than the following dates of each year: • First quarter – March 31 • Second Quarter – June 30 • Third Quarter – September 30 • Fourth Quarter – December 18 (early deadline) **MM 4.8-3** All new permitted stationary sources associated with the CCS project shall comply with the Cap-and Trade regulation (e.g., by reducing greenhouse gas emissions within their facilities or by surrendering greenhouse gas allowances, offset credits, or other compliance instruments to offset the greenhouse gas increases), and implement Best Performance Standards applicable to greenhouse gas reduction for Components at Light Crude Oil and Natural Gas Production, Natural Gas Processing Facilities. **MM 4.8-4** The CCS project shall implement methods to recover for reuse or destroy methane existing in associated gas and casinghead gas, as follows: a. Recover all associated gas produced from the reservoir via new wells, regardless of the well type, except for gas produced from wildcat and delineation wells or as a result of start-up, shutdown and maintenance activities (whether planned or unplanned), system failures, and emergencies in accordance with San Joaquin Valley Air Pollution Control District regulations (Rule 4401 and 4409), as this may be amended over time. **MM 4.8-5** The CCS project shall implement any regulations adopted or amended for methane.	Significant and unavoidable	Significant and unavoidable

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Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		MM 4.8-6 The project shall offset all greenhouse gas emissions associated with the capture facility, and construction equipment not covered by the Cap-and-Trade program or other mandatory greenhouse gas emission reduction measures through owner/operator reductions of greenhouse gas emissions as verified by the San Joaquin Valley Air Pollution Control District, through acquisition of offset credits from the California Air Pollution Control Officers Association Exchange Register or other third party greenhouse gas reductions as verified by the San Joaquin Valley Air Pollution Control District, or through inclusion in an Emission Reduction Agreement, to offset Project-related greenhouse gas emissions that are not included in the Cap-and-Trade program to assure that no net increase in greenhouse gas emissions from the Project construction or operation occur. All sources providing CO_2 for injection must certify that any additional CO_2 generated from the source capture facility has been mitigated to "no net increase" before injection at Carbon TerraVault I (Kern County).		
Impact 4.8-2 Conflict with any Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases	Potentially significant	Implement **MM 4.8-1** and **MM 4.8-2.**	Significant and unavoidable	Significant and unavoidable
Impact 4.8-3 Cumulative Greenhouse Gas Emissions Impacts	Potentially significant	Implement **MM 4.8-1** through **MM 4.8-6**	N/A	Significant and unavoidable
Hazards and Hazardous Materials				
Impact 4.9-1 Create a Significant Hazard to the Public or the Environment through the Routine Transport, Use, or Disposal of Hazardous Materials	Potentially significant	**MM 4.9-1** Prior to The Owner/operator shall provide a comprehensive Worker Environmental Awareness Program to the County with its first CCS project-related permit application in each calendar year. The program shall include all training requirements identified in Owner/operator Best Management Practices and mitigation measures and include training for all field personnel (including Owner/operator employees, agents and contractors). The Worker Environmental Awareness Program 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. The Worker Environmental Awareness Program shall be provided to the surface owner at the time of the application pathway process so the surface owner may educate employees as well. **MM 4.9-2** The Owner/operator shall arrange for transportation, storage, and disposal of all hazardous materials in compliance with the Hazardous Materials Transportation Act**.** Drivers transporting hazardous materials or wastes should follow the measures recommended by the Federal Motor Carrier Safety Administration for avoiding roll-over accidents which include the following standards for cargo tank trucks: a. Avoid sudden movements that may lead to roll-overs. b. Maintain control of the load in turns and on straight roadways. c. Identify in advance of transport high risk areas on designated roads. d. Follow driver mandates for being alert and attentive behind the wheel. e. Control speed and maintain proper "speed cushions" described by the Federal Motor Carrier Safety Administration.	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		MM 4.9-3 The Owner/operator shall implement the following practices based on practices and standards established by the United States Department of Labor Occupational Safety and Health Administration (OSHA) safety standards and as amended or modified by the State of California Department of Industrial Relations, Division of Occupational Safety and Health (DOSH – Cal/OSHA) and the Kern County Fire Department. a. Construction activities shall be conducted to allow for easy clean-up of spills. Construction crews shall have the appropriate number of tools, supplies, and absorbent and barrier materials to contain and recover spilled materials. b. Fuels and lubricants shall be stored only at designated staging areas. Fuel and lubricant tanks shall have secondary spill containment (e.g., curbs). Compliance with laws and regulations is required, including compliance with hazardous materials and hazardous waste storage laws, as applicable. c. Storage of fuel and lubricants in the staging area shall be at least 100 feet away from the edge of water bodies. Refueling and lubrication of equipment shall be restricted to upland areas at least 100 feet away from stream channels and wetlands. d. Any fuel truck shall carry an oil spill response kit and spill response equipment at all times. e. Owner/operator s shall be required to perform all routine equipment maintenance at the well pad or other suitable locations (i.e., maintenance yards), and promptly collect and lawfully dispose of wastes in compliance with existing regulatory requirements. f. Berms and/or dikes (secondary containment) shall be constructed around the permanent above-ground bulk tanks and the foundations shall be installed with a passive leak detection system, so that potential spill materials shall be contained and collected in specified areas isolated from any water bodies. Tanks shall not be placed in areas subject to periodic flooding or washout. Compliance with laws and regulations is required, including compliance with hazardous materials and hazardous waste storage laws as applicable, including for secondary containment, such as Geologic Energy Management Division regulation (Title 14, C.C.R. § 1773.1), which requires secondary containment in "an engineered impoundment such as a catch basin, which can include natural topographic features, that is designed to capture fluid released from a production facility." g. The appropriate amount and supply of sorbent and barrier materials shall be maintained on construction sites consistent with the type and level of construction activities. Sorbent and barrier materials shall also be utilized to contain runoff from contaminated areas consistent with CalOSHA regulations. h. Shovels and drums shall be stored at each well pad or be readily available. If small quantities of soil become contaminated, hand tools shall be used to collect the soil and the material shall be stored in storage drums. Large quantities of contaminated soil may be bio-remediated on-site or at a designated remediation facility, subject to government approval, or collected utilizing heavy equipment, and stored in drums or other suitable containers prior to disposal. Should contamination occur adjacent to staging areas as a result of runoff, shovels and/or heavy equipment shall be utilized to collect the contaminated material. Contaminated soil shall be disposed of in accordance with state and federal regulations. i. Above-ground tanks, valves and other equipment shall be visually inspected monthly and when the tank is refilled. Inspection records shall be maintained. Owner/operator s shall periodically check tanks for leaks or spills. j. Drain valves on all tanks shall be locked to prevent accidental or unauthorized discharges from the tank. k. Equipment maintenance shall be conducted in staging areas or other suitable locations (i.e., maintenance shops or yards). l. The Owner/operator shall maintain equipment in operating condition to reduce the likelihood of fuel or oil line breaks and leakage. Any vehicles with chronic or continuous leaks shall be removed from the site and repaired before being returned to operation.		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		MM 4.9-4 All CCS related CO_2 facility pipelines shall require construction permit site plan review by the Kern County Planning and Natural Resources Department. With the exception of necessary connections directly to the capture or injection facility, all portions of the CO_2 pipeline shall be undergrounded within a defined corridor. The site plan shall include the full location of the facility pipeline, width of easement for the pipeline, location and spacing of automatic shut off values, location of infra-red cameras for monitoring, construction and coatings used for the pipeline and all other requirements of Federal and State regulations. Specific safety fencing shall be provided for pipeline protection. General reference to "compliance with regulations "will not be considered sufficient. The site plan package shall concurrently be submitted to the Kern County Planning and Natural Resources Department, Kern County Fire Marshall and California State Fire Marshall for review and approval. The plan shall include all details and features to show compliance with 49 CFR Part 195. The U.S. Department of Transportation (U.S. DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA) has delegated CO_2 pipeline oversight to the State Fire Marshall, who will evaluate pipelines for compliance with PHMSA. All costs for review by all parties shall be borne by the owner/operator. The Owner/operator shall notify the Kern County Public Health Services Environmental Health Division, Certified Union Program Agency (CUPA), surface landowner, and sensitive receptors located within 300 feet, of any hazardous materials/waste release, other then CO_2, immediately upon discovery, and to other applicable agencies as required by other laws. The Owner/operator shall immediately contain the leak (e.g., by isolating or shutting down the leaking equipment), clean up contaminated media (e.g., soils), and repair the leak prior to recommencing operations. The Owner/operator shall report the status and progress of the leak repair and remediation work to the County and the CUPA on monthly intervals or predetermined intervals until the repair has been completed. Contaminated media shall be analyzed according to 22 C.C.R. §§ 66261.21-66261.24 for determination of hazardous waste disposal subject to the Hazardous Waste Determination procedures provided in 22 C.C.R. §66262.11. **MM 4.9-5** Prior to initiation of ground disturbing activities, the Owner/operator shall complete Phase II ESA activities within areas of ground disturbance. Develop a Soil Management Plan for implementation during Project construction activities to properly manage affected soils/wastes that are encountered during ground disturbing activities. **MM 4.9-6** If, during grading or excavation work, the Owner/operator observes evidence of contamination or if soil contamination is suspected, work near the excavation site shall be terminated, the work area cordoned off and required health and safety procedures implemented for the location by the contractor's Health and Safety Officer. Samples shall be collected by a trained and qualified individual. Analytical data from suspected contaminated material shall be reviewed by the contractor's Health and Safety Officer. If the sample testing determines that contamination is not present, work may proceed at the site; however, if contamination is detected above regulatory limits, the Kern County Public Health Services Department shall be notified. All actions related to encountering unanticipated hazardous materials at the site shall be documented and submitted to the Kern County Public Health Services Department for legal direction from the regulatory agency. **MM 4.9-7** The Owner/operator shall implement measures to prevent the release or accidental spillage of solid waste, garbage, construction debris, sanitary waste, industrial waste, naturally occurring radioactive materials, oil and other petroleum products, and other wastes into water bodies or water sources, including all applicable practices listed below. Other standards may also be utilized, provided that a professional engineer, certified industrial hygienist or certified safety professional certifies to the County that such standards are as or more protective of human health and the environment, as compared to the standards in the referenced Environmental Protection Agency manual. The following are practices and standards that shall be implemented. a. Classify the various wastes for disposal as described in United States Environmental Protection Agency 2002, and in accordance with applicable California laws and regulations. b. Size reserve pits to avoid overflows.		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		c. Use closed loop mud systems with oil-based muds except in compliance with State Water Resources Board or Regional Water Quality Control Board requirements as provided in Mitigation Measure 4.9-3. d. Review safety data sheets of materials used and use the less toxic material for the operation. e. Design systems with the smallest volumes possible (e.g., drilling mud systems). f. Reduce the amount of excess fluids entering reserve and production pits. g. Keep non-exempt wastes out of reserve or production pits. h. Design the drilling pad to contain stormwater and rigwash. i. Recycle and reuse oil-based muds and high-density brines when such recycling and reuse complies with hazardous waste laws and recycling laws. j. Perform routine equipment inspections and maintenance to prevent leaks or emissions. k. Reclaim oily debris and tank bottoms when such reclamation complies with hazardous waste laws and recycling laws. l. Store only the volume of materials at facilities necessary for permitted work. m. Construct berms around materials and waste storage areas that meet engineering standards to contain spills. n. Perform routine inspections of materials and waste storage areas to locate damaged or leaking containers. o. Train personnel in all waste management practices required by the mitigation measures, all legal standards and the permits issued by Kern County, CalGEM and all regulatory agencies. **MM 4.9-8** The following specific measures should be implemented at a minimum when conducting CCS development activities, as applicable: a. Impervious secondary containment, such as containment dikes, containment walls, and drip pans shall be constructed and maintained around all qualifying petroleum facilities, including tank batteries and separation, and treating areas consistent with the Environmental Protection Agency's Spill Prevention, Control, and Countermeasures regulation (40 Code of Federal Regulations 112). The containment structure must have sufficient volume to contain, at a minimum, the content of the largest storage tank containing liquid hydrocarbons within the facility/battery and engineered freeboard to contain precipitation. Drip pans shall be routinely checked and cleaned of petroleum or chemical discharges and designed to prevent access by wildlife and livestock.as determined by the qualified biologist. b. Chemical containers shall not be stored on bare ground and shall be maintained in good condition and shall be placed within secondary containment in case of a spill or high velocity puncture. c. Containment dikes are not to be constructed with topsoil or coarse, insufficiently impervious spoil material that is insufficiently impervious to meet requirements. Containment is strongly suggested for produced water tanks. Chemicals shall be placed within secondary containment and stored so that the containers are not in contact with soil or standing water and product and hazard labels are not exposed to weathering. d. Maintain a clean well location. Remove trash, junk, and other materials not in current use. **MM. 4.9-9** Prior to commencement of any construction or grading, the owner/operator is required to provide written evidence of all of the following requirements: 1. Issuance of an EPA UIC Program Construction permit 2. Compliance with all applicable conditions of the approved Conditional Use Permit		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		3. Compliance with all applicable requirements of the adopted Mitigation Measure and Reporting Program. **MM 4.9-10** Prior to commencement of any testing or full operation to inject CO_2, the owner/operator is required to provide written evidence of all of the following requirements: 1. Written correspondence from the Environmental Protection Agency (Region 9) UIC program to the Kern County Planning and Natural Resources Department that the owner/operator has fully complied with all requirements of the EPA issued UIC CCS Program permit and EPA is authorizing commencement of injection, for testing or commencement of injection for full operations. 2. Compliance with all applicable conditions of the approved Conditional Use Permit 3. Compliance with all applicable requirements of the adopted Mitigation Measure and Reporting Program. **MM 4.9-11** All sources that provide CO_2 for injection to the Carbon TerraVault (Kern County) project must have been disclosed to the Kern County Planning and Natural Resources Department and EPA in writing and be legally permitted to operate by the county or city where they are located. **MM 4.9-12** No confidential information or sources may be used in the operation of this facility. All information provided to the Federal government or State of California regarding construction or operation of the facility or incidents at the facility shall be reported concurrently to the Kern County Planning and Natural Resources Department. In the case of emergencies or releases, the information shall be communicated immediately upon discovery to the Kern County Fire Marshall and Public Health with reports to the Kern County Planning and Natural Resources Department within 24 hours after.		
Impact 4.9-2 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	Potentially significant	Implement **MM 4.9-1** through **MM 4.9-21**, **MM 4.9-13** As part of the Hazardous Materials Business Plan and the spill prevention, control, and Countermeasures Plan, the Owner/operator shall require annual worker training requirements to: increase awareness of the most common types of failures and methods to avoid mistakes, shall maintain records of employee training, and shall make such records available to the County for review upon request. **MM 4.9-14** The Owner/operator shall comply with the California Geologic Energy Management Division requirements for assuring safe drilling and drill casing practices, well design, construction and well management requirements, blowout requirements, and all other provisions of 14 California Code of Regulations 1744 and other applicable Geologic Energy Management Division regulations to any wells being abandoned as a result of the CCS project. The Owner/operator shall also reduce the incidence of well control loss by following the practices described in Recommended Practice for Well Control Operations. **MM 4. 9-15** The Owner/operator shall report project-related contamination, including previously unknown injection wells, of a reportable quantity of hazardous substances, as specified in the Code of Federal Regulations Title 40 and/or the California Code of Regulations Titles 22 and 23, which is discovered during Project construction activities and operations. Notification must be made within 24 hours of discovery to Kern County Public Health Environmental Health Division, Kern County Planning and Natural Resources Department and all State and Federal implementing regulatory agencies that have responsibility or oversight of the specific contamination conditions and activity. The Owner/operator shall remediate such contamination as required by the Kern County Environmental Health Division and the appropriate implementing regulatory agency.	Less than Significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Impact 4.9-3 Emit Hazardous Emissions or Handle Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School	Potentially significant	**MM 4. 9-16** The owner/operator shall provide a written notice of the specific location of the approved CCS project Surface Land Area using a map along with Assessor Parcel Numbers (APN) and sections with a link to the Kern County Planning and Natural Resources website all of the following agencies: a. All local school districts within 20 miles b. California Division of State Architect c. California Department of Education. The notice shall be sent within 60 days of the date of the approval of the project and annually by January 31. A final letter shall be sent when the project is decommissioned with information on the responsible party managing the closed facility.	Less than significant	Less than significant
Impact 4.9-4 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 create a significant hazard to the public or the environment.	Potentially significant	Implement **MM 4.9-5** and **MM 4.9-6.**	Less than significant	Less than significant
Impact 4.9-5 For a project located within the Adopted Kern County Airport Land Use Compatibility Plan, would the project result in a Safety Hazard or excessive noise for People Residing or Working in Project Area	Potentially significant	**MM 4.9-17** The Owner/operator shall determine whether any proposed construction or alteration meets requirements for notification of the Federal Aviation Administration. If a proposed construction or alteration is found to require notification, the Owner/operator shall notify the Federal Aviation Administration and request that the Federal Aviation Administration issue a Determination of No Hazard to Air Navigation. If the Federal Aviation Administration determines that the construction or alteration would result in a potential hazard to air navigation, the Owner/operator would be required to work with the Federal Aviation Administration to resolve any adverse effects or airport operations. The Owner/operator shall notify the Federal Aviation Administration and the nearest Airport, by completing and submitting Federal Aviation Administration Form 7460-1 if CCS project components or associated development activities are planned that meet one or more of the following criteria: a. Any construction or alteration exceeding 200 feet above ground level. b. Any construction or alteration within 20,000 feet of all public use airports except Poso-kern Airport which exceeds a 100:1 surface from any point on the runway. c. Any construction or alteration within 10,000 feet of the Poso-Kern Airport which exceeds a 50:1 surface from any point on the runway. d. Any construction or alteration within 5,000 feet of a public use heliport which exceeds a 25:1 surface. e. When requested by the Federal Aviation Administration. f. Any construction or alteration located on a public use airport or heliport regardless of height or location.	Less than significant	Less than significant
Impact 4.9-6 Impair Implementation of, or Physically Interfere with, an Adopted Emergency Response Plan or Emergency Evacuation Plan	Potentially significant	Implement **MM 4.17-1** (see Section 4.17, *Transportation*), and **MM 4.9-18** Prior to commencement of any injection of CO_2, and in addition to the emergency response plan required by the EPA UIC permit, the owner/operator shall prepare an emergency incident response plan that addresses, advance leak detection methods and communication with fire responders, emergency medical response, Kern County Fire and Kern County Sheriff notification and protocols for incident management. The plan shall be reviewed and approved by the Kern County Fire Department in consultation with EPA UIC Program, State of California Fire Marshall, Kern County Sheriff and all other State agencies identified by the California Air Resources Board.	Less than significant	Less than significant

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Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Impact 4.9-7 Expose People or Structures either directly or indirectly, to a Significant Risk of Loss, Injury, or Death Involving Wildland	Potentially significant	**MM 4.9-19** The Owner/operator is required to implement the following measures: a. Comply with Kern County Fire Codes. b. Maintain firefighting apparatus and supplies required by the Kern County Fire Department. c. Maintain of a list of all relevant fire-fighting authorities for each work site. d. Have available equipment to extinguish incipient fires and or construction of a fire break, such as: chemical fire extinguishers, shovels, axes, chain saws, etc. e. Carry water or fire extinguishers and shovels in non-passenger vehicles in the field. f. Have and maintain a supply of fire extinguishers for welding, grinding, and brushing crews in compliance with the in compliance with Cal/OSHA regulations. g. Use available resources to protect individual safety and to contain any fire that occurs and notify local emergency response personnel. h. Remove any flammable wastes generated during oil and gas activities regularly. i. Store all flammable materials used in oil and gas activities away from ignition sources and in approved containers. j. Allow smoking only in designated smoking areas. k. Prohibit smoking where flammable products are present and when the fire hazard is high. Train personnel regarding potential fire hazards and their prevention. l. All internal combustion engines, stationary and mobile, shall be equipped with spark arresters. Spark arresters shall be in good working order. m. Light trucks and cars with factory-installed (type) mufflers shall be used only on roads where the roadway is cleared of vegetation. Said vehicle types shall maintain their factory-installed (type) muffler in good condition. n. Fire rules shall be posted on the Project bulletin board at the contractor's field office and areas visible to employees. o. Equipment parking areas and small stationary engine sites shall be cleared of all extraneous flammable materials. p. Personnel shall be trained in the practices of the Fire Safety Plan relevant to their duties. Construction and maintenance personnel shall be trained and equipped to extinguish small fires in order to prevent them from growing into more serious threats. **MM 4.9-20** The Owner/operator should restrict the use of chainsaws, chippers, vegetation masticators, grinders, tractors, torches, and explosives at its locations, and ensure the sites where this equipment is used are equipped with portable or fixed fire extinguishers and/or a water tank, with hoses, fire rakes, and other tools to extinguish and or control incipient stage fires. The Worker Environmental Awareness Program shall include fire prevention and response training for workers using these tools.	Less than significant	Less than significant

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Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Impact 4.9-8 Would implementation of the project generate vectors (flies, mosquitoes, rodents, etc.) or have a component that includes agricultural waste. Specifically, would the project exceed the following qualitative threshold: The presence of domestic flies, mosquitoes, cockroaches, rodents, and/or any other vectors associated with the project is significant when the applicable enforcement agency determines that any of the vectors: (i) Occur as immature stages and adults in numbers considerably in excess of those found in the surrounding environment; and (ii) Are associated with design, layout, and management of project operations; and (iii) Disseminate widely from the property; and (iv) Cause detrimental effects on the public health or well-being of the majority of the surrounding population.	Potentially significant	**MM 4.9-21** Owner/operator s shall ensure that trash is stored in closed containers and removed from the site at regular intervals. Open containers shall be inverted, and construction ditches shall not be allowed to accumulate water. Construction and maintenance operations shall not generate standing water. Naturally occurring depressions, drainages, or pools at the site shall not be drained or filled without a permit from any regulatory agency having jurisdiction over the resource location.	Less than significant	Less than significant
Impacts 4.8-9 Contribute to Cumulative Hazards and Hazardous Materials Impacts	Potentially significant	Implement **MM 4.9-1** through **MM 4.9-21**, as described above, risk reduction measures, as described in Section 4.6, *Geology and Soils*, and mitigation measures to maintain water quality, as described in Section 4.9, *Hydrology and Water Quality*.	N/A	Less than significant
Hydrology and Water Quality				
Impact 4.10-1 The project would violate water quality standards or waste discharge requirements, or otherwise substantially degrade surface or ground water quality.	Potentially significant	Implementation of **MM 4.9-1** would be required (see Section 4.9, *Hazards and Hazardous Materials*, for full mitigation measure text). **MM 4.10-1** The Owner/operator shall comply with all applicable federal, state, regional and local agency water quality protection laws and regulations, and commonly utilized industry standards, including (where applicable) obtaining coverage under the stormwater construction general permit and industrial general permit issued by the State Water Resources Control Board and complying with industry stormwater management standards for construction and operational activities. The Owner/operator shall obtain Class VI UIC permit(s) for all new or converted CO_2 wells from the U.S. EPA UIC program and fully comply with all requirements. **MM 4.10-2** A. The project shall comply with the following. 1. In areas subject to National Pollutant Discharge Elimination System stormwater permitting requirements, project Owner/operators shall file a Notice of Intent to the State Water Resources Control Board to comply with the statewide General Permit for Discharges of Stormwater Associated with Construction Activities (Construction General Permit State Water Resources Quality Control Board Order No 2009-009-DWO) (as such permit may be amended, revised or superseded) prior to undertaking all ground-disturbing activities greater than one acre and shall prepare and implement a Stormwater Pollution Prevention Plan for construction activities on the Project site in accordance with the Construction General Permit. For facilities requiring coverage under the Construction General Permit, the site specific Stormwater Pollution Prevention Plan shall include measures to achieve the following objectives: (1) all pollutants and their sources, including sources of sediment associated with construction activity are controlled; (2) all non-stormwater discharges are identified and either eliminated, controlled and treated, (3) site Best Management Practices are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity and	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		(4) stabilization Best Management Practices to reduce or eliminate pollutants after construction are completed. The Stormwater Pollution Prevention Plan shall be prepared by a qualified preparer and shall include the minimum Best Management Practices required for the identified risk level. The Stormwater Pollution Prevention Plan shall include a construction site monitoring program that identified requirements for dry weather visual observations of pollutants at all discharge locations and, as applicable, depending on the project risk level, sampling of site effluent and receiving waters. A qualified Stormwater Pollution Prevention Plan practitioner shall be responsible for implementing and all monitoring for the Best Management Practices as well as all inspection, maintenance and repair activities at the project site. If applicable, each project shall also implement and fully comply with the Industrial Storm Water Permit (Order No 97-03-DWO) and Kern County Municipal Stormwater Permit (Order No 5-01-120). All plans under these requirements shall be submitted to Kern County Public Works for review and approval. Any change to this State Water Regional Control Board determination will require full compliance with National Pollutant Discharge Elimination System requirements. 2. Any operator not subject to National Pollutant Discharge Elimination System stormwater permitting requirements shall implement Best Management Practices during construction and operation. All selected practices shall be shown on a drainage implementation plan and self-certified as complete by a licensed professional qualified in drainage and flood control issues. The plan shall be submitted to the Kern County Planning and Natural Resources Department. The following Best Management Practices shall be implemented and shown on the drainage implementation plan: a. Utilizing established facilities design and construction standards as applicable (e.g., American Society for the Testing and Materials (ASTM) American Petroleum Institute (API). b. Implementing good housekeeping and maintenance practices: i. Preventing trash, waste materials and equipment from construction storm water. ii. Maintaining wellheads, compressors, tanks and pipelines in good condition without leaks or spills. iii. Designing and maintaining graded pads to not actively erode and discharge sediment iv. Maintaining vehicles in good working order v. Providing secondary containment for all aboveground storage tanks and maintaining such containment features in good operating condition c. Implementing spill prevention and response measures: i. Utilizing preventative operating practices such as tank level monitoring, safe chemical handling and conducting regular inspections. ii. Developing and maintaining a spill response plan iii. Conducting spill response training for employees and have a process to ensure contractors have the necessary training iv. Maintaining spill response equipment on site. d. Implementing material storage and management practices: i. Preventing unauthorized access ii. Utilizing “run-on” and “run-off” control berms and swales iii. Stabilizing exposed slopes through vegetation and other standard slope stability methods.		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		B. The CCS project shall comply with all applicable state ,federal and local stormwater management laws. Prior to construction or grading, the owner/operator shall submit a drainage and flood study plan to the Kern County Public Works -Floodplain division for review and approval. The Owner/operator shall prepare a drainage plan that complies with requirements to address runoff and the potential for impeding or redirecting 100-year flood flows. The drainage plan shall be prepared in accordance with the Kern County Grading Ordinance, Kern County Green Code, Development Standards and approved by the Kern County Department of Public Works, Floodplain Management Section. The drainage plan shall specify best management practices to prevent all construction pollutants from contacting stormwater, with the intent of keeping sedimentation or any other pollutants from moving offsite and into receiving waters. The requirements of the Plan shall be incorporated into design specifications. Recommended best management practices for the construction phase must be shown on a drainage plan, and shall include the following: d. Erosion Control - 1. Scheduling of construction activities to avoid rain events. 2. Implementing runoff erosion control methods consistent with the drainage plan when vegetation has been removed. e. Sediment Control - 1. Secure stockpiling of soil. 2. Installation of a stabilized construction entrance/exit and stabilization of disturbed areas. f. Non-stormwater Control - 1. Fueling and maintenance of equipment and vehicles shall be managed so as to prevent contamination of runoff from the site. 2. Concrete handling techniques shall be consistent with the drainage plan and shall comply with Mitigation Measure 4.14-15 (m). g. Waste and Material Management - 1. Managing construction materials, consistent with the drainage plan and designating construction staging areas in or around the Project site. 2. Stockpiling and disposing of demolition debris, concrete, and soil in compliance with regulatory requirements and consistent with the drainage plan. 3. Prompt removal and disposal of litter. 4. Disposal of demolition debris, concrete and soil in compliance with regulatory requirements for solid waste. 5. Provide and maintain secondary containment to prevent or eliminate pollutants from moving offsite and into receiving waters in compliance with Mitigation Measure 4.8-3. h. Post-Construction Stabilization - 1. Ensuring the stabilization of all disturbed soils per revegetation or application of a soil binder. C. If construction activities will alter federal jurisdictional waters, project Owner/operator s shall comply with the federal Clean Water Act Section 404 and Section 401 permitting and certification requirements. If construction		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		activities will alter state waters, project Owner/operator s shall comply with California Department of Fish and Wildlife Streambed Alteration requirements. **MM 4.10-3** All drilling operations must either use a closed loop system to avoid discharges of drilling muds and fluids, or obtain coverage under the State Water Resources Control Board low threat discharge General Order (Waste Discharge Requirements General Order 2003-0003-DWQ), obtain individual Waste Discharge Requirements issued by the Central Valley Regional Water Quality Control Board for the unit, or obtain coverage under a general order issued by the Central Valley Regional Water Quality Control Board applicable to drilling ponds. Any surface ponds or sumps must be cleared of fluids and muds in accordance with the State Water Resources Control Board general order, applicable Water Discharge Requirements and Division of Oil Gas and Geothermal Resources regulations. Compliance with the State Water Resources Control Board or Central Valley Regional Water Quality Control Board low-threat discharge orders or Water Discharge Requirements, if closed-loop systems are not used, and applicable laws, regulations and standards will reduce potential surface water quality impacts from contact with drilling muds or fluids during drilling and construction to less than significant levels. **MM 4.10-4** The Owner/operator shall not conduct any Class VI injection activity regulated by the UIC program that discharge into any underground source of current or future beneficial use groundwater, including drinking water. The Owner/operator must demonstrate compliance with U.S. EPA Class VI UIC permit conditions. **MM 4.10-5** The Owner/operator shall not discharge produced water into any surface disposal facility unless the facility has received the Waste Discharge Requirements from the Central Valley Regional Water Quality Control Board, or the need for Water Discharge Requirements has been waived by the Central Valley Regional Water Quality Control Board. As required by the SB 4 regulations, well stimulation treatment fluids and produced fluids from wells that have been stimulated cannot be stored, discharged, or disposed into surface ponds or pits.		
Impact 4.10-2 The project would 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	Implement **MM 4.19-1** (see Section 4.19, *Utilities and Service Systems*).	Less than significant	Significant and unavoidable
Impact 4.10-3 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: (i) result in a substantial erosion or siltation on- or offsite; (ii) substantially increase the rate of amount of surface runoff in a manner which would result in flooding on-or offsite; (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (iv) impede or redirect flood flows.	Potentially significant	Implement **MM 4.10-1** and **MM 4.10-2**.	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Impact 4.10-4 The project would, in a flood hazard, tsunami, or seiche zone, risk release of pollutants due to project inundation.	No impact	No mitigation measures are required.	No impact	No impact
Impact 4.10-5 The project would conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	No impact	No mitigation measures are required.	No impact	No impact
Impact 4.10-6 Contribute to Cumulative Hydrologic Resources Impacts	Potentially significant	Implement of Mitigation Measures **MM 4.9-1, MM 4.10-1, MM 4.10-2, MM 4.10-3, MM 4.10-4, MM 4.10-5**, and **4.19-1** would be required (see Section 4.9, *Hazards and Hazardous Materials*, and Section 4.19, *Utilities and Service Systems*, for full mitigation measure text).	N/A	Significant and unavoidable
Land Use and Planning				
Impact 4.11-1 Physically Divide an Established Community	No impacts	No mitigation measures are required.	No impact	No impact
Impact 4.11-2 Conflict with Any Applicable Land Use Plan, Policy, or Regulation adopted for the purpose of avoiding or mitigating an environmental effect	Less than significant	**MM 4.11 -1** Any proposed use of any portion of the CCS Surface Land Area for Solar or energy storage for electricity for any use onsite or offsite will require a Conditional Use Permit and evaluation of the project under the California Environmental Quality Act (CEQA). Any application submitted to the Kern County Planning and Natural Resources Department for any type of solar or energy storage shall include a written acknowledgement that the solar or energy storage Owner/operator is aware that if approved, the CUP will have site specific restrictions and conditions for operation related to the location as part of the CCS Surface Land Area. Any such project shall include, but not be limited to, the following mitigation measures: A. No activities are being authorized for use of the area that would involve drilling of any water wells or other exploratory activities that would penetrate the confined cap layer as restricted by the approved CCS CUP. B. No use of the buffer area around the injection well sites is included in any construction activity. C. Written acknowledgement that solar owner, contractor and/or operator has been informed and has a binding agreement to not conduct any activities near or in proximity to either the injection well sites or the capture facilities that would damage the fencing or equipment. D. The solar or energy storage project shall include a Worker Awareness Program for the all contractors and employees of the use that the project is within the area for the underground storage of CO_2. E. That the project is bound by all applicable requirements of the Carbon TerraVault 1 (Kern County) CUP and EIR Mitigation Monitoring and Reporting Plan. **MM 4.11-2** Use of the CCS Surface Land Area is restricted to Agricultural Cultivation (**MM 4.10-1**), Solar and Energy Storage (**MM 4.10-1**), Conservation (**MM 4.10-6**) and oil and gas exploration and production with appropriate permits. All other uses are prohibited.	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		MM 4.11-3 The Kern County Building Department Permitting Portal (Accela) shall have a notation in each individual Assessor Parcel Numbers (APN) that is included in the CCS Surface Land Area of the following: **"***This Parcel is included in the approved Carbon Capture and Storage Conditional Use Permit (Carbon Terra Vault 1, [Kern County] by California Resources Corporation). Uses are specifically limited to only the approved Carbon Capture and Storage project, agricultural cultivation, conservation and permitted oilfield activities. No building permits can be issued without specific review and approval from the Kern County Planning and Natural Resources Department for any use."* **MM 4.11-4** No Lot Line Adjustment may be made that adds land to any parcels included in the CCS Surface Land Area without a formal modification of the CUP at a hearing and review under CEQA. Any recorded Lot Line Adjustment to reduce the size of the CCS Surface Land Area to conform to the Approved Area of Review or reduce the parcel used for monitoring or seismic wells may be done administratively by submitting a CUP site plan map with the reduced CCS Surface Land Area shown and notation of the new parcels that are included in the CUP boundary but will be outside the CCS Surface Land Area. **MM 4.11-5** Prior to any grading or building or construction, a deed restriction notification document shall be recorded by the applicant with language as approved by the Kern County Planning and Natural Resources Department that gives constructive notice that the CCS Surface Land Area, described by both APNS and legal description, is an approved Carbon Capture and Storage project subject to a Conditional Use Permit and related Environmental Impact Report. The document shall be recordable and provide information for access to the following information that shall be updated quarterly or as applicable: A. Names of operator of CCS facility and physical address of headquarters and email, dates of injection, quantity of injections, and specific injection zone or zones. B. The recorded conservation easement on the 640 acres of APN 157-060-02 shall be acknowledged in the notification document as superseding any restrictions of the approved CUP and related EIR. C. Sixty (60) days before commencing the first injection of CO_2, the applicant shall provide written notice to all owners (surface and mineral) within the CUP boundary and all adjacent property owners (surface and mineral) by certified mail. The notice shall be reviewed and approved, before mailing by the applicant, by the Kern County Planning and Natural Resources Department. **MM 4.11-6** If the EPA reports, based on the monitoring evidence, that the approved Area of Review for the underground CCS storage has expanded outside the boundaries of the CCS Surface Land Area, a formal modification of the CUP boundary shall be made at a noticed public hearing at the Kern County Board of Supervisors and all applicable mitigation measures implemented**.** **MM 4.11-7** All CO_2 injected into Carbon TerraVault 1 (CTV1) must comply with the following criteria. Written evidence of such compliance shall be submitted to the Kern County Planning and Natural Resources Department for review and approval. A. Source of CO_2 must be from an industry within Kern County. B. Only the following industries may send captured CO_2 for injection to CTV1. 1. Hydrogen – Green 2. Hydrogen – Blue 3. Biomass Carbon Removal and Storage (BiCRS) 4. Cement production 5. Green Steel production		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		6. Oilfield gas streams 7. Power Plants 8. Direct Air Capture 9. Alternative Fuel production C. The source of the captured CO_2 must comply with the following conditions: 1. Projects within unincorporated Kern County: the listed use is approved in an appropriately zoned parcel with CO_2 capture and transport requiring an additional Conditional Use Permit and Environmental Impact Report for compliance with CEQA. 2. Projects within an incorporated City in Kern County: the listed use has capture technology for CO_2 that shows compliance with the preparation of an environmental document, with Kern County as a Responsible Agency and not the use of an exemption from CEQA review. 3. All CO_2 pipelines for transport from offsite sources that traverse unincorporated Kern County land require a Conditional Use Permit and Environmental Impact Report for compliance with CEQA. Any CO_2 pipelines that are permitted by the California Public Utilities Commission for a common carrier company that requests to connect to CTV 1 for injection are not covered by this EIR and either (a) must comply with a CUP and EIR by Kern County before injection can commence into CTV1, or (b) Kern County has participated in the CPUC process and reasonable and feasible mitigation for protection of Kern County communities has been included. 4. The injected CO_2 from an approved source is in full compliance with all requirements of State law and the Federal EPA permit.		
Impact 4.11-3 Contribute to Cumulative Land Use and Planning Resource Impacts	Potentially significant	Implement **MM 4.11-1** through **MM 4.11-7**, as described above, and **MM 4.15-1** and **MM 4.15-2,** as described in Section 4.15, *Public Services*.	N/A	Less than significant
Minerals				
Impact 4.12-1 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	Potentially significant	No mitigation measures.	Significant and unavoidable.	Significant and unavoidable
Impact 4.11-2 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	Potentially Significant	No mitigation measures.	Significant and Unavoidable	Significant and unavoidable
Impact 4.11-3 Contribute to Cumulative Mineral Resources Impacts	Potentially Significant	No mitigation measures.	N/A	Significant and unavoidable

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Noise				
Impact 4.13-1 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	Potentially significant	**MM 4.13.-1** **CONSTRUCTION** Prior to issuance of any grading or construction permits, the owner/operator shall comply with the following noise information regarding both construction and operations phase of the project. **1. Noise Site Map** A map showing the location of any sensitive receptors within 4,000 feet of the construction activity. A sensitive receptor is defined as a single or multi-family dwelling unit, place of public assembly (a legally permitted place where 100 or more people gather together in a building or structure for the purpose of amusement, entertainment, or retail sales), church, institution, school, or hospital. If there are no sensitive receptors within the 4,000-foot potential impact area, then no construction or operational noise measures shall be required. ,. **2. Noise Standards** 1. For locations where the ambient level is below 65 dB, noise levels from operation of the well may not increase the existing ambient level at the property line of the sensitive receptor by more than 5dB and may not exceed 65 dB at the property line of the sensitive receptor. 2. For locations where the ambient level is at or in excess of 65 dB, noise levels from operation of the well may not increase the existing ambient level at the property line of the sensitive receptor by more than 1 dB. **3. Acoustic Noise Reduction Report** 1. An Acoustic Noise Reduction Report completed by a qualified professional shall be provided if the there are sensitive receptors within 4000 feet. . The report and submitted site vicinity map shall include all dimensions and detailed notes, based on the Acoustic Noise Reduction Report detailed in this measure. 2. Clearly marked distances in feet and with coordinates from the construction location on the well site to the nearest sensitive receptors both exterior wall of the receptor and the property line within the potential impact area. 3. Notes showing the average day-night level (DNL or Ldn) of ambient outdoor noise level at the proposed well location and at the property line of the nearest identified sensitive receptors that face the drill site over a 24-hour period. 4. Specific details from the Acoustic Noise Reduction Report specifying the level of project activity noise at the property line of the sensitive receptor allowed under the Noise Standard and the projected level of noise from the Project. 5. The report shall identify and include the specific noise reduction method or methods that will be implemented and shall not include options for compliance. Any changes to the selected method or methods of compliance after approval will require submission of an amended Acoustic Noise Reduction Report reflecting the new selection.	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		Construction a. Placement of a temporary sound attenuation wall(s) on property controlled by the applicant or with written permission from the property owner. b. Construction of a temporary berm on property controlled by the applicant or with written permission from the property owner/ c. Specific orientation of the drilling equipment on the well site and modification of equipment to reduce noise impacts. d. Implementation of other detailed sound reduction technologies or practices with evidence from the qualified professional of the reductions achieved. **e.** Written confirmation from the occupants of the sensitive receptor(s) of their voluntary, temporary relocation or business restrictions during a defined construction period. **Operation** a. A permanent barrier wall or combination wall and berm that will reduce the noise level from operations to meet the standard. Installation to be completed before commencement of operation of capture equipment and first injection of CO_2. b. Changes in operational equipment or tempo of operations that will reduce the noise level from operations to meet the standard. **4. Monitoring** **Construction** a. For the duration of the construction the following measurements shall be submitted to the Kern County Planning and Natural Resources Department at the required intervals. The measurements shall show achievement of the stated average day and night noise level stated on the Site Plan. If the measurement does not show the level is achieved, additional measures must be proposed and installed to prevent a stop work notice. Failure to submit within one business day after taking the required measurements will result in a stop work notice. b. 24 hours after completion of all noise attenuation measures and commencement of drilling or rework activities, the applicant shall take a measurement at the ambient level at the property line of the identified, nearest sensitive receptor. c. Every 14 days after commencement of activities, the applicant shall take a measurement at the ambient level at the property line of the identified, nearest sensitive receptor until completion of construction activities. d. All installed noise attenuation measures shall be maintained throughout all construction phase activities. **Operations** a. Concurrent with the commencement of capture activities and injection of CO_2, agreements with the sensitive receptor property owners shall be completed for 24 hour noise monitoring. An operational noise monitoring report shall include 7 days of 24 hour monitoring at the sensitive receptor property line during normal operations of the CCS project. If the noise standard is not achieved, then additional mitigation for operations is required to be submitted and implemented after review and approval by Kern County Planning and Natural Resources.		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Impact 4.13-2 Exposure of Persons to, or Generate, Excessive Groundborne Vibration or Groundborne Noise Levels	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.13-3 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	No impact	No mitigation measures are required.	No impact.	No impact.
Impact 4.13-4 Contribute to Cumulative Noise Impacts	Potentially significant	Implement **MM 4.13-1**.	N/A	Significant and unavoidable
Population and Housing				
Impact 4.14-1 Induce Substantial 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).	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.14-2 Displace Substantial Numbers of Existing Housing or People, Necessitating the Construction of Replacement Housing Elsewhere	No impact	No mitigation measures are required.	No impact	No impact
Impact 4.14-3 Contribute to Cumulative Population and Housing Impacts	Less than significant	No mitigation measures are required.	N/A	Less than significant
Public Services				
Impact 4.15-1 The project would result in the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection services or police protection services.	Potentially significant	**MM 4.15-1** The project proponent/operator shall work with the County to determine how the use of sales and use taxes from construction of the project can be maximized. This process shall include, but is not necessarily limited to, the project proponent/operator obtaining a street address within the unincorporated portion of Kern County for acquisition, purchasing and billing purposes, and registering this address with the State Board of Equalization. As an alternative to the aforementioned process, the project proponent/operator may make arrangements with Kern County for a guaranteed single payment that is equivalent to the number of sales and use taxes that would have otherwise been received (less any sales and use taxes actually paid); with the amount of the single payment to be determined via a formula approved by Kern County. The project proponent/operator shall allow the County to use this sales tax information publicly for reporting purposes. **MM 4.15-2** Prior to the issuance of any building permits on the project, the project operator shall submit a letter detailing the hiring efforts prior to commencement of construction, which encourages all contractors of the project site to hire at least 50 percent of their workers from local Kern County communities. The project operator shall provide the contractors a list of	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		training programs that provide skilled workers and shall require the contractor to advertise locally for available jobs, notifying the training programs of job availability, all in conjunction with normal hiring practices of the contractor. **MM 4.15.-3** The following Cumulative Impact Oil and Gas Reservoir Pore Space Charge (CIC-ORPS) shall be implemented as an annual payment due every year for the life of the project or as a lump sum payment for multiple years until the project is decommissioned under MM 4.15- 5 or the Conditional Use Permit is modified. 1. Prior to grading or construction, a CIC-OPRS site plan shall be submitted by the applicant. The map shall calculate the CIC-ORPS net acreage as follows: A. Total gross acreage of the approved Conditional Use Permit CCS Surface Land area. B. Total acres for the "net " calculation may exclude existing unpaved oilfield roads, public access easements, conservation easements and pipelines utilizing a 50 feet total width easement. All such exclusions are to be mapped and shown as to location on the CIC-ORPS site plan. C. Calculation for payment of the CIC-ORPS. 2. A payment of from $O up to $400 per net acre shall be paid annually for all acres in the approved Conditional Use Permit regardless of phased implementation of facilities or the project injection schedule. The payment schedule shall be as follows: 1. First 12 months of operation after first injection made, regardless of amount injected or months without injection activity. – no payment 2. Year 2 – Year 6 - $200 per net acre 3. Year 7 – Year 10 - $300 per net acre 4. Year 11 – end of injection - $400 per net acre 5. The first payment is due on the 13th month after the first date of injection of any CO_2, including any test injection. Annual payments are due every year after based on the date of the first-year payment. B Payments shall be made to the Planning and Natural Resources Department for transfer directly to the County Administrative Office (CAO) Fiscal Division and labeled Cumulative Impact Oil and Gas Reservoir Pore Space Charge (CIC-ORPS) with the project name, location, and APNs. C. An advance payment option for a lump sum of future payment years, 5 or more years at once , or a reduction in each year's payment for 5 or more years with a lump sum payment at the end of the reduction period , may be requested by submittal of a written request to the Kern County Planning and Natural Resources Department with details of the offer no later than 90 days before the yearly payment is due. The offer shall be reviewed and approved by the County Administrative Office (CAO). 3. A 10 % reduction in the per net acre annual payment shall be granted by the CAO for To qualified injection sources, after submittal of a request, if they meet all of the following criteria. a. A Qualified Injection Source is a new legally permitted operating facility, that pays local property taxes, located in unincorporated Kern County on land owned by California Resources Corporation (CRC) that sends CO_2 to Carbon TerraVault 1 (Kern County) for injection. b. All components of a facility, including onsite accessory electricity production or energy storage count as one facility. Only one 10% reduction will be applied on each facility that qualifies even if phased.		

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		c. The facility must be operating at the time of the first payment that is made that includes the reduction. The reduction will be reviewed annually by the CAO for applicability. c. Projects on land not owned by CRC or in incorporated cities or other counties or pipelines on CRC land do not qualify. d. The final determination on meeting the criteria and implementation of the reduction shall be made by the CAO after review of the applicant submittal. Requests for a reduction may be made no earlier than 90 days before the next scheduled payment by written letter to the Kern County Planning and Natural Resources Department who shall verify the location and facility permitting before transmitting to the CAO. 4. If at any time, the Kern County Tax Assessor verifies that the Franchise Tax Board has determined that pore space utilized for storage of CO_2 may be assessed for local property tax and a method for valuation has been established, then the County Administrative Office may request the CIC-ORPS amount be adjusted. Reduction for pore space property tax assessment or deletion of the entire CIC-ORPS may only be made by the Kern County Board of Supervisors at a noticed public hearing for the amendment of MM 4.15-3 with appropriate findings of facts. **MM 4.15-4** An annual payment of $ 250,000 shall be made to the Kern County Planning and Natural Resources Department for transfer to the Kern County Fire Department for equipment and training specific to the detection and control of emergency situations caused by CO_2. The first payment is due 60 days after the issuance by the EPA Class VI UIC permit for construction of any well. Annual payments are due every year on the date of the first year payment. **MM 4.15-5** The owner/operator shall provide written notification that the facility is being prepared for closure and the permanent end of injection activities. The following are Kern County requirements for closure and long-term management of the Carbon Capture and Storage area. A. Within 30 days of the final and last injection of CO_2 and evidence notice has been given to the EPA UIC Director of the end of all injection activities, the first payment of $ 100,000 (Completion Funding) shall be made, and on that annual date thereafter, to the Kern County Planning and Natural Resources Department for transfer to the County Administrative Office (CAO). The funding shall be used as determined by the Kern County Board of Supervisors for any budget item as long as consultation with all State and Federal agencies for the 50 years of required monitoring is accomplished. No bond or other instrument of credit may substitute for the required cash Completion Funding payment. Any emergency incident response and related coordination by County departments shall be billed to the owner/operator for full reimbursement at no net cost to Kern County. The Completion Funding shall **not** be reduced or offset by any potential contributions from the State or Federal government to Kern County for monitoring and maintenance responsibilities. B. Upon receipt of the one-time Completion Funding, the Kern County Planning and Natural Resources Department shall prepare a modification of the Conditional Use Permit for consideration at a noticed public hearing of the Kern County Board of Supervisors. The modification of the Conditional Use Permit shall include, but not be limited to, the necessary findings and actions to modify Conditional Use Permit conditions to address the CCS project is now in long term closure and monitoring, and ending of the annual payments for the Cumulative Impact Oil and Gas Reservoir Pore Space Charge (CIC-ORPS) (MM 4.15-3) and the Fire Department CO_2 mitigation (MM 4.15-4).		
Impact 4.15-2 Contribute to Cumulative Public Service Impacts	Potentially significant	Implement **MM 4.15-1** through **MM 4.15-5**, as described above.	N/A	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Recreation				
Impact 4.16-1 Increase the Use of Existing Neighborhood and Regional Parks or Other Recreational Facilities Such That Substantial Physical Deterioration Would Occur or Be Accelerated	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.16-2 Include Recreational Facilities or Require Construction or Expansion of Recreational Facilities That Might Have an Adverse Physical Effect on the Environment	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.16-3 Cumulative Impact on Recreational Facilities	Less than significant	No mitigation measures are required.	N/A	Less than significant
Transportation and Traffic				
Impact 4.17-1 The Project would conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.17-2 The Project would Conflict or be Inconsistent With CEQA Guidelines § 15064.3 (b)	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.17-3 The Project would substantially increase hazards due to a design feature (e.g., Sharp Curves or Dangerous intersections) or Incompatible Uses (e.g., farm equipment)	Potentially significant	**MM 4.17-1** Prior to the issuance of construction or building permits, the project proponent/operator shall provide a written statement of any movement of oversized/ overweight vehicles that would require transport over publicly maintained State or County roads. The following shall be implemented for any such transport: 1. Obtain all necessary encroachment permits for work within the road right-of-way, or use of oversized/overweight vehicles that will utilize County-maintained roads, which may require California Highway Patrol or a pilot car escort. Copies of the approved traffic plan and issued permits shall be submitted to the Kern County Planning and Natural Resources Department and the Kern County Public Works Department-Development Review. 2. Prepare and submit a Construction Traffic Control Plan to Kern County Public Works Department-Development Review and the California Department of Transportation offices for District 9, as appropriate, for approval. The Construction Traffic Control Plan must be prepared in accordance with both the California Department of Transportation Manual on Uniform Traffic Control Devices and Work Area Traffic Control Handbook and must include, but not be limited to, the following issues: a. Timing of deliveries of heavy equipment and building materials. b. Directing construction traffic with a flag person.	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
		c. Placing temporary signing, lighting, and traffic control devices if required, including, but not limited to, appropriate signage along access routes to indicate the presence of heavy vehicles and construction traffic. d. Ensuring access for emergency vehicles to the project site. e. Temporarily closing travel lanes or delaying traffic during materials delivery, transmission line stringing activities, or any other utility connections. f. Maintaining access to adjacent property. g. Specifying both construction-related vehicle travel and oversize load haul routes, minimizing construction traffic during the AM and PM peak hour, distributing construction traffic flow across alternative routes to access the project sites, and avoiding residential neighborhoods to the maximum extent feasible. h. Institute construction work hours as necessary, such that the arrival and/or departure times of workers would be staggered, as necessary. i. Identifying vehicle safety procedures for entering and exiting site access roads.		
Impact 4.17-4 The Project would Result in Inadequate Emergency Access	Potentially significant	Implement **MM 4.17-1**.	Less than significant	Less than significant
Impact 4.17-5 Contribute to Cumulative Transportation Impacts	Potentially significant	Implement **MM 4.17-1.**	N/A	Less than significant
Tribal Cultural Resources				
Impact 4.18-1a The project would 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).	Potentially significant	**MM 4.18-1** Prior to issuance of grading or building permit, the owner/operator shall send individual notification letters to all Native American Tribes listed by the California Native American Heritage Commission for the area covered by the CUP. The notification letter shall include a site plan, list of APNs included in the CUP and contact information for the owner/operator. After operation, the notification letter shall be sent annually by January 31 of each year. A final letter shall be sent as part of the closure plan with contacts for the managing entity for long-term managing and monitoring. The owner/operator shall provide reasonable access and consultation for any tribal representative with concerns or questions about tribal resources that may be within the CCS Surface Land Area or facilities within the CUP.	Less than significant	Less than significant
Impact 4.18-1b The project would 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	Potentially significant	Implement **MM 4.5-1**, **MM 4.5-3**, and **MM 4.18-1** (see Chapter 4.5, *Cultural Resources*).	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
applying the criteria set forth in subdivision (c) of Public Resources Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.				
Impact 4.18-2 Contribute to Cumulative Tribal Cultural Resource Impacts	Potentially significant	Implement **MM 4.5-1, MM 4.5-3,** and **MM 4.18-1** (see Chapter 4.5, *Cultural Resources*).	N/A	Less than significant
Utilities and Service Systems				
Impact 4.19-1 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.	Less than significant	Implement stormwater mitigation measures, as described in Section 4.9, Hydrology and Water Quality.	Less than significant	Less than significant
Impact 4.19-2 Have Sufficient Water Supplies Available to Serve the Project and Reasonably Foreseeable Future Development During Normal, Dry and Multiple Dry Years.	Potentially significant	**MM 4.19-1** Prior to issuance of a construction permit for any CCS project applicant, the owner/operator shall provide information on any groundwater or reclaimed water that will be used. Unmetered water wells cannot be used as a source of groundwater for the permit activity. Groundwater may only be used in a permitted activity from a water well equipped with a water meter. The Planning and Natural Resources Department shall compile the water use information in a report that shall be posted on the Kern County Planning and Natural Resources website for public use by December 31 of each calendar year. A copy shall be sent to all Groundwater Sustainability Agencies and the Kern County Water Agency after being posted on the website. The information submitted on the permit shall include the following data: • The source and estimated amount of any groundwater being used in the permit activity. • Confirmation that any water well used in permit activity is metered. • The source and estimated amount of any reclaimed water used in the permit activity.	Less than significant	Significant and unavoidable
Impact 4.19-3 Result in a Determination by the Wastewater Treatment Provider Which Serves or May Serve the Project That it Has Adequate Capacity to Serve the Project's Projected Demand in Addition to the Provider's Existing Commitments.	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.19-4 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.	Potentially significant	**MM 4.19-2** During construction activities for Project facilities, the Applicant shall not store construction waste onsite for longer than the duration of the construction activity or transport any waste to any unpermitted facilities. The Applicant shall also reduce construction waste transported to landfills by recycling solid waste construction materials, such as taking materials to recycling and reuse locations listed in the brochure on recycling construction and demolition materials available on the Kern County Public Works Department, website.	Less than significant	Less than significant

Table 1-3: Draft EIR Impacts, Mitigation Measures, and Level of Impacts After Mitigation

Impact	Level of Significance before Mitigation	Mitigation Measure(s)	Level of Significance Project	Level Cumulative
Impact 4.19-5 Comply with Federal, State, and Local Management and Reduction Statutes and Regulations Related to Solid Waste	Potentially significant	Implement **MM 4.19-2.**	Less than significant	Less than significant
Impact 4.19-6 Cumulative Impacts on Utilities and Service Systems	Potentially significant	Implement **MM 4.19-1** and **MM 4.19-2**	N/A	Significant and unavoidable
Wildfire				
Impact 4.20-1 Substantially Impair an Adopted Emergency Response Plan or Emergency Evacuation Plan	Less than significant	No mitigation measures are required.	Less than significant	Less than significant
Impact 4.20-2 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	Less than significant	No mitigation measures are proposed.	Less than significant	Less than significant
Impact 4.20-3 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	Less than significant	Implement **MM 4.9-18** through **MM 4.9-20**, found in Section 4.9, *Hazards and Hazardous Materials*.	Less than significant	Less than significant
Impact 4.20-4 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	Less than significant	Implement **MM 4.10-1**, found in Section 4.10, *Hydrology and Water Quality.*	Less than significant	Less than significant
Impact 4.20-5 Contribute to Cumulative Wildfire Impacts	Less than significant	Implement **MM 4.9-18**, **MM 4.9-19**, **MM 4.9-20**, and **MM 4.10-1.**	N/A	Less than significant

Chapter 2

Introduction

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Chapter 2
Introduction

2.1 Intent of California Environmental Quality Act

This document is the Recirculated Draft Environmental Impact Report (RDEIR) for the Carbon TerraVault I (Kern County) Project (CTV I, or project) proposed by California Resources Corporation (CRC). This introduction provides background information concerning this document, explains how the changes made to the previous Draft Environmental Impact Report are shown, and describes the procedure for commenting on this RDEIR.

The Kern County Planning and Natural Resources Department (KCPNR), as lead agency, has determined that an Environmental Impact Report (EIR) must be prepared for the proposed project. The project is the consideration of the approval of multiple Conditional Use Permits (CUP) (CUP No. 13 Map No. 118, CUP No. 14 Map No. 118, CUP No. 5 Map 119, CUP No. 6 Map 119, CUP No. 3, Map 120, and CUP No. 2 Map No. 138) for the construction and operation of an approximately 9,104-acre carbon capture and storage (CCS) facility with related capture facilities and pipeline for the initial source and request associated Zone Change Cases (ZCC No. 5, Map 119 and ZCC No. 4, Map 120) from A-1 (Limited Agriculture) to A (Exclusive Agriculture) on approximately 6,160 acres. The facility consists of proposed U.S. Environmental Protection Agency (EPA) Class VI Underground Injection Control (UIC) wells, approximately 11 miles of underground facility and injection pipeline for capture from the pre-combustion gas, and related infrastructure improvements for the capture, transfer, and storage of carbon dioxide (CO_2).

The proposed project site is located within the Elk Hills oilfield (Elk Hills), which comprises a 75-square-mile (47,800-acre) complex in the San Joaquin Valley of unincorporated Kern County (see Figure 3-1 Regional Location). The site, which contains parcels owned privately by CRC, is located on the west side of Elk Hills Road and to the north side of Skyline Road, within the administrative boundary Elk Hills. The site can be accessed through the primary gated security entrance to Elk Hills at the western intersection of Skyline Drive and Elk Hills Road and via private oilfield roads. The boundaries of the CCS Surface Land Area and Underground Approved Storage Area (pore space) for the project area are approximately 26 miles from Bakersfield city center, approximately 8.5 miles from the city of Taft, approximately 5 miles from the unincorporated community of Tupman, and approximately 4 miles from the unincorporated community of Buttonwillow. The closest injection well or capture facility site is approximately 26 miles from the Bakersfield city center, approximately 8.5 miles from the City of Taft, 6 miles from the unincorporated community of Buttonwillow, approximately 6 miles from the unincorporated community of Tupman, and 4.5 miles from McKittrick.

The proposed project at full operation is designed to capture up to 1.46 million tons of concentrated CO_2 in Section 26R during Phase 1 (up to 26 years), and up to 750,000 tons of concentrated CO_2 in Section A1A2 in Phase 2 for a total of 2,210,000 tons capacity for injection. As part of Phase 1,

101,743 tons per year (tpy) of compressed CO2 will be captured and injected, and as part of Phase 2, up to 101,743 tpy of compressed CO2 will be captured and injected for a total of 203,485 tpy from the initial source-captured pre-combustion gas associated with the Elk Hills oilfield. The CO2 would then be transported by facility pipeline to the dedicated Class VI UIC wells for the project, all of which would be located within the existing CUP boundary. The CO_2 would be injected into the identified geographically confined reservoirs for storage, becoming part of the rock through mineralization in perpetuity.

This EIR has been prepared pursuant to the following:

- The California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq.)
- CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Section 15000 et seq.)
- The Kern County CEQA Implementation Document

The overall purposes of the CEQA process are to:

- Ensure that the environment and public health and safety are protected in the face of discretionary projects initiated by public agencies or private concerns.
- Provide for full disclosure of the project's environmental effects to the public, the agency decision-makers who will approve or deny the project, and responsible and trustee agencies charged with managing resources (e.g., wildlife, air quality) that may be affected by the project.
- Provide a forum for public participation in the decision-making process with respect to environmental effects.

2.2 Purpose of this Environmental Impact Report

An EIR is a public informational document used in the planning and decision-making process. This project-level EIR analyzes the environmental impacts of the project. The Kern County Planning Commission and Board of Supervisors will consider the information in the EIR, including the public comments and staff response to those comments, during the public hearing process. The final decision is made by the Board of Supervisors, who may approve, conditionally approve, or deny the project. The purpose of an EIR is to identify:

- The significant potential impacts of the project on the environment and indicate the manner in which those significant impacts can be avoided or mitigated
- Any unavoidable adverse impacts that cannot be mitigated
- Reasonable and feasible alternatives to the project that would eliminate any significant adverse environmental impacts or reduce the impacts to a less-than-significant level

An EIR also discloses growth-inducing impacts; impacts found not to be significant; and significant cumulative impacts of the project when taken into consideration with past, present, and reasonably anticipated future projects.

CEQA requires that an EIR reflect the independent judgment of the lead agency regarding the impacts, the level of significance of the impacts both before and after mitigation, and mitigation measures proposed to reduce the impacts. A Draft EIR is circulated to responsible agencies, trustee agencies with resources affected by the project, and interested agencies and individuals. The purposes of public and agency review of a Draft EIR include sharing expertise, disclosing agency analyses, checking for accuracy, detecting omissions, discovering public concerns, and soliciting mitigation measures and alternatives capable of avoiding or reducing the significant effects of the project, while still attaining most of the basic objectives of the project.

2.2.1 Background

The CTV I EIR was originally noticed and circulated for public comment from December 19, 2023, to February 12, 2024. On January 17, 2024, an extension of the comment period was noticed for December 19, 2023, to March 1, 2024. A textual error in Section 4.3, *Air Quality* resulted in the printing of the document with the deletion of Mitigation Measure 4.3-9, which is now shown as 4.3-5. The online document and this document have been corrected to include this mitigation measure. All public comments received on the previous circulation can be found in Appendix A-7, along with the summaries and dates of the three Public Workshops (Appendix A-5). The noticed March 28, 2024, Planning Commission referenced in the Notice of Availability was continued to August 22, 2024, Planning Commission.

2.2.2 Reason for Recirculation

County staff has determined, following a review of the written comments and release of the EPA Class VI Permit for Reservoir 26R, that changes should be made in the previously circulated Draft EIR. New or revised information or analysis has been included in this RDEIR. Section 15088.5, of the Guidelines adopted by the Governor's Office of Planning and Research for CEQA (Guidelines) provides that a lead agency is required to recirculate an EIR to add significant new information or make changes in analysis that considers additional data or new information.

CEQA Guidelines Section 15088.5 (f)(1) provide that when an EIR is revised and the entire EIR is circulated, Kern County, as the lead agency, may require reviewers to submit new comments, and the lead agency need not respond to comments received during an earlier circulation period. Kern County will therefore respond in the Final RDEIR only to new comments received regarding this RDEIR, received during the new comment period.

2.2.3 Issues to Be Resolved

Section 15123(b) (3) of the *CEQA Guidelines* requires that an EIR contain issues to be resolved, which include the choices among alternatives and whether or how to mitigate significant impacts.

The major issues to be resolved regarding a project include the following decisions by the lead agency:

- Determine whether the Draft EIR adequately describes the environmental impacts of the project.
- Identify a preferred choice among alternatives.
- Determine whether the recommended mitigation measures should be adopted or modified.
- Determine whether additional mitigation measures need to be applied to the project.

2.3 Terminology

To assist readers in understanding this EIR, terms used are defined in the following manner:

- ***Project*** means the whole of an action that has the potential for resulting in a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment.
- ***Environment*** means the physical conditions that exist within the area that will be affected by the proposed project, including, but not limited to, land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. The area involved is the locale in which significant direct or indirect impacts would occur as a result of the project. The environment includes both natural and human-created conditions.
- ***Impacts*** analyzed under CEQA must be related to a physical change. Impacts are:
  - Direct or primary – Impacts that would be caused by the proposed project and would occur at the same time and place of project implementation; or
  - Indirect or secondary – Impacts that are caused by the proposed project at a later time or farther removed in distance but are still reasonably foreseeable. Indirect or secondary impacts may include growth-inducing impacts and other effects related to induced changes in the pattern of land use, population density or growth rate, or related effects on air, water, and other natural systems, including ecosystems.

  Significant impact on the environment means a substantial, or potentially substantial, adverse change in any of the physical conditions in the project vicinity affected by the proposed project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. An economic or social change resulting from a project by itself is not considered a significant impact on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant.
- ***Mitigation*** consists of measures to avoid or substantially reduce the proposed project's significant environmental impacts by:
  - Avoiding the impacts altogether by not taking a certain action or parts of an action;

  - Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
  - Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
  - Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the actions; or
  - Compensating for the impacts by replacing or providing substitute resources or environments.

- ***Cumulative Impacts*** are two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts. The following statements also apply when considering cumulative impacts:
  - The individual impacts may be changes resulting from a single project or separate projects.
  - The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over time.

This EIR uses a variety of terms to describe the level of significance of adverse impacts. These terms are defined as follows:

- ***Less than significant***: An impact that is adverse but that does not exceed the defined thresholds of significance. Less than significant impacts do not require mitigation.
- ***Significant***: An impact that exceeds the defined thresholds of significance and would or could cause a substantial adverse change in the environment. Mitigation measures are recommended to eliminate the impact or reduce it to a less than significant level.
- ***Significant and unavoidable***: An impact that exceeds the defined thresholds of significance and cannot be eliminated or reduced to a less than significant level through the implementation of mitigation measures.

2.4 Decision-Making Process

CEQA requires lead agencies, in this case Kern County, to solicit and consider input from other interested agencies, citizen groups, and individual members of the public. CEQA also requires the project to be monitored after it has been permitted to ensure that mitigation measures are carried out.

CEQA requires the lead agency to provide the public with a full disclosure of the expected environmental consequences of the project and with an opportunity to provide comments. In

accordance with CEQA, the following is the process for public participation in the decision-making process:

- **Initial Study (IS)/Notice of Preparation (NOP).** Kern County prepared and circulated an IS/NOP for 30 days to the responsible agencies, trustee agencies, and local agencies as well as other interested parties for review and comment beginning on March 4, 2022, and ending on April 4, 2022.
- **Draft EIR Preparation/Notice of Completion (NOC).** A Draft EIR is prepared, incorporating public and agency responses to the IS/NOP and the scoping process. The Draft EIR is circulated for review and comment to appropriate agencies and additional individuals and interest groups who have requested to be notified of EIR projects. Per Section 15105 of the *CEQA Guidelines*, Kern County will provide for a 45-day public review period on the Draft EIR. Kern County will subsequently respond to each comment on the Draft EIR received in writing through a Response to Comments chapter in the Final EIR. The Response to Comments will be provided to each agency or person who provided written comments on the EIR a minimum of 10 business days before the scheduled Planning Commission hearing on the Final EIR and project.
- **Preparation and Certification of Final EIR**. The Kern County Planning Commission will consider the Final EIR and the project, acting in an advisory capacity to the Kern County Board of Supervisors. Upon receipt of the Planning Commission's recommendation, the Board of Supervisors will also consider the Final EIR, all public comments, and the project, and take final action on the project. At least one public hearing will be held by both the Planning Commission and Board of Supervisors to consider the Final EIR, take public testimony, and then approve, conditionally approve, or deny the project.

2.4.1 Initial Study/Notice of Preparation

In accordance with *CEQA Guidelines* Section 15082 (a) (Notice of Preparation) and the County's Guidelines, the KCPNR circulated an IS/NOP for a 30-day public review. The IS/NOP was sent to the State Clearinghouse, public agencies, special districts, responsible and trustee agencies, and other interested parties for a public review period that began on March 4, 2022, and ended on April 4, 2022.

The purpose of the IS/NOP is to formally covey that Kern County, as the lead agency, solicited input regarding the scope and proposed content of the EIR. The IS/NOP, scoping meeting, and community workshop materials, comment letters received, and a complete summary of all scoping comments are included as Appendix A.

2.4.2 Scoping Meeting

Pursuant to Section 15082 (c)(1) of the *CEQA Guidelines*, for projects of statewide, regional, or area-wide significance, the lead agency is required to conduct at least one scoping meeting. The

scoping meeting is for jurisdictional agencies and interested persons or groups to provide comments regarding, but not limited to, the range of actions, alternatives, mitigation measures, and environmental effects to be analyzed. Kern County hosted a scoping meeting on March 18, 2022, at the KCPNR, located at 2700 "M" Street, Suite 100, Bakersfield, California. During the March 18, 2022, scoping meeting, no members of the public were present, and no testimony was given.

IS/NOP and Scoping Meeting Results

Specific environmental concerns raised in written comments received during the IS/NOP public review period are discussed below. The IS/NOP and all comments received are included in Appendix A.

IS/NOP Written Comments

The County received 14 letters with substantive comments in response to the IS/NOP. The comments are summarized in Table 2-1.

Table 2-1: Summary of Comments on the Notice of Preparation

Commenter	Summary of Comment
State	
Caltrans Email March 24, 2022	Indicates a traffic control permit may be required during construction phase if large construction vehicles and equipment will use the State Highway System. Indicates that a "Pre-Submittal" meeting be scheduled with District 6 Encroachment Permit Office prior to an encroachment permit application submittal.
Caltrans Scott Lau, Associate Transportation Planner Email April 7, 2022	Verified receipt of the NOP by Caltrans. No comments were made on the content of the NOP.
Native American Heritage Commission Letter March 7, 2022	Recommends consultation with California Native American tribes in geographic area. Compliance with AB 52 and SB 18 and provides recommendations for cultural resource assessment.
State of California – Natural Resources Agency Department of Fish and Wildlife Letter April 6, 2022	Indicates the project area is known to support high densities of several special-status animal species and there is information regarding the extensive rare biological resources present throughout Elk Hills oilfield. Recommends the EIR address if the project would have a substantial adverse effect on any species identified in local or regional plans, policies, or regulations, or by CDFW or the USFWS. Address issues, impacts, and mitigation measures regarding Blunt-Nosed Leopard Lizard; San Joaquin Kit Fox; Giant, Tipton, and Short-Nosed Kangaroo Rat; San Joaquin Antelope Squirrel; Swainson's Hawk; Special-status Plants; Burrowing Owl; and other state species of special concern. Recommends consulting with USFWS regarding impacts to federally listed species. Indicates that if streams, swales, or drainages occur on the project site, project activities may be subject to CDFW's regulatory authority. Encourages project implementation to occur during the bird non-nesting season and ensuring the project does not result in violation of the Migratory Bird Treaty Act. Suggests the EIR analyze any potential direct or indirect impacts to this conserved habitat and the associated special status species.

Table 2-1: Summary of Comments on the Notice of Preparation

Commenter	Summary of Comment
Local Agencies	
Kern County Environmental Health Division Letter March 23, 2022	Indicates that the design of the project/type of improvement is not likely to cause serious public health problems.
Kern County Public Works Letter April 4, 2022	Recommends the following conditions be placed on the CUPs: all survey monuments be tied out by a Licensed Land Surveyor, all survey monuments destroyed be rest or have a suitable witness corner set, and all survey monuments shall be accessible by a Licensed Land Surveyor or representatives.
Kern County Superintendent of Schools Letter March 14, 2022	Indicates that the project will have no significant effects on district facilities so long as statutory school fees, if any, are collected as required by law and that no further mitigation measures regarding school facilities are necessary.
Public Works Department Floodplain Management Section Email March 9, 2022	Verified receipt of the NOP by the Public Works Department.
San Joaquin Valley Air Pollution Control District Letter April 4, 2022	Recommends that a more detailed preliminary review of the project be conducted for the project's construction and operational emissions. Indicates that the additional environmental review should consider: using California Emission Estimator Model (CalEEMod), truck routing, cleanest available truck, reduction of idling of heavy duty trucks, and electric on-site off-road and on-road equipment. Recommends the EIR include a discussion on the implementation of a Voluntary Emission Reduction Agreement, which provides pound-for-pound mitigation of emissions increases through a process that develops, funds, and implements emission reduction projects, with the District serving a role of administrator of the emissions reduction projects and verifier of the successful mitigation effort. Recommends: the project be evaluated for potential health impacts to surrounding receptors resulting from construction toxic air contaminant emissions, an ambient air quality Analysis be performed, and the EIR include a discussion of a cumulatively considerable net increase of any criteria pollutant. Indicates the project should comply with applicable District rules and regulations.
Interested Parties	
Center for Biological Diversity and Central Valley Air Quality Coalition Letter April 4, 2022	Indicates disagreement with the premise that the project should play a role in achieving California's goal of reaching near-zero emissions. Suggests that the County phase out fossil fuel development. Expresses that underground storage of carbon can contaminate drinking water, trigger earthquakes, and result in carbon leaks. Emphasizes that the County must adequately define the project and analyze the potential impacts to the environment in detail.
Kern Audubon Society Email April 2, 2022	Indicates that the project area has potential to support San Joaquin kit fox, Blunt-nosed leopard lizard, American badger, San Joaquin antelope squirrel, Tipton kangaroo rat, giant kangaroo rat, western burrowing owl, Swainson's hawk, golden eagle, and loggerhead shrike. The society hopes to see the project utilize already disturbed portions of the area while minimizing disturbances to existing native ground and vegetation. Indicates that the biological site evaluation should be performed by qualified biological consultants using appropriate survey protocols and during the appropriate time of year to discern species presence.

Table 2-1: Summary of Comments on the Notice of Preparation

Commenter	Summary of Comment
Mark H. Email March 6, 2022	Questions how CO_2 will remain in the ground and if all wells will be analyzed and remediated. Indicates that Bakersfield operators do not have a subsidence mitigation plan and questions how operators will handle this. Indicates that cement degrades under influence of CO_2 and questions how regulators will de-risk this.
Stephen Reid, PG Email March 15, 2022	Questions if CRC provided information on petroleum reservoirs and if there is a CRC document to be reviewed by the public.
Sierra Club, Kern-Kaweah Chapter Letter April 4, 2022	Expresses that CCS may not address drivers for reductions in greenhouse gas emissions as it allows the fossil fuel industry to continue. Indicates that the EIR must: disclose whether the injected CO_2 will be used for enhanced oil recovery, determine other similar projects that have been successful, disclose the specific "local industrial sources" of the CO_2, state what technologies will be used and if they utilize fossil fuels, state the percentage of CO_2 to be captured, state how much CO_2 will be emitted, and determine what communities will be affected by the transport process. Indicates the EIR must include measures to satisfy safety standards and EPA requirements for Class VI wells. Indicates the EIR must address CO_2 leakage. Indicates the EIR must consider alternatives to the project, including: a Renewable Energy Alternative, a Leave-it-in-the-Ground Alternative, a combination of the previous two alternatives, and a Nature-based Carbon Sequestration Alternative. Recommends that the EIR compare the economic feasibility of other alternatives to the proposed project. Suggests that the EIR account for these considerations and determine an environmentally superior alternative. Indicates the EIR should: address criteria pollutant air pollution, require pre-construction surveys, consider replanting native plant species, consider kit fox conservation measures, include a comprehensive traffic study, address the potential for groundwater contamination and depletion.

Key:
AB = Assembly Bill
Caltrans = California Department of Transportation
CDFW = California Department of Fish and Wildlife
CCS = carbon capture and storage
CO_2 = carbon dioxide
CRC = California Resources Corporation
CUP = Conditional Use Permit
EIR = Environmental Impact Report
NOP = Notice of Preparation
SB = Senate Bill
USFWS = U.S. Fish and Wildlife Service

2.4.3 Availability of the Draft Recirculated Environmental Impact Report

This Draft Recirculated EIR is being distributed directly to agencies, organizations, and interested groups and persons for comment during a 45-day formal review period in accordance with Section 15087 of the *CEQA Guidelines*. This Draft Recirculated EIR and the full administrative record for the project, including all studies, is available for review during normal business hours Monday through Friday at the Kern County Planning Department, located at:

Kern County Planning and Natural Resources Department
2700 "M" Street, Suite 100
Bakersfield, CA 93301-2370
Contact: Keith Alvidrez, Lead Planner
Phone: (661)862-5015, Fax: (661)862-8601
Alvidrezk@kerncounty.com

2.4.4 Previous Draft EIR Circulation/Workshop Summary

This section applies to the previous Draft EIR. With mutual agreement between the local agency and project applicant, the circulation period for public review of the EIR was extended to a 72-day period, beginning December 19, 2023, and ending March 1, 2024. Within this timeframe, both in-person and online informational workshops were made available to surrounding communities. Meeting materials were made available in both English and Spanish. One in-person workshop was held in the City of Taft, and two in-person workshops were held in the unincorporated community of Buttonwillow. One virtual workshop was provided for community members with internet access.

- Each workshop included a Kern County presentation outlining the project overview, EIR overview, EPA permit process, and details on the public process and how to submit a comment. A breakout session presented by the EPA Region 9 Water Division manager and environmental engineer outlined the EPA permit process for the project. Details on the date and time for each location are as follows:
  - Taft workshop: January 30, 2024, 6:00 p.m. to 9:00 p.m.
  - Buttonwillow workshop: January 31, 2024, 6:00 p.m. to 9:00 p.m. and February 28, 2024, 3:00 p.m. to 5:00 p.m.
  - Virtual meeting: January 17, 2024, 3:00 p.m. to 5:00 p.m.

Meeting materials are available in Appendix A-5 and at https://kernplanning.com/environmental-doc/ctv1/.

A total of 17 verbal comments were received during the public workshops described above. Additionally, the County received 24 letters with substantive comments in response to the Draft EIR. A summary of all comments and copies of all comment letters received during the Draft EIR circulation are included in Appendix A.

2.5 Format and Content

This EIR addresses the potential environmental effects of the project and was prepared following input from the public and responsible and affected agencies, and through the EIR scoping process, as discussed previously. The contents of this EIR were based on the findings in the IS/NOP, and public and agency input. Based on the findings of the IS/NOP, a determination was made that an EIR was required to evaluate potentially significant environmental effects on the following resources:

- Aesthetics and Visual Resources
- Agricultural and Forest 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
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

2.5.1 Required Environmental Impact Report Content and Organization

Table 2-2 contains a list of sections required under CEQA, along with a reference to the chapter in which they can be found in this document.

Table 2-2: Required Environmental Impact Report Contents

Requirement (CEQA Section)	Location in EIR
Table of Contents (Section 15122)	Table of Contents
Summary (Section 15123)	Chapter 1
Project Description (Section 15124)	Chapter 3
Environmental Setting (Section 15125)	Chapter 4
Significant Environmental Impacts (Section 15126.2)	Chapter 4
Environmental Setting	Chapter 4
Mitigation Measures (Section 15126.4)	Chapter 4
Cumulative Impacts (Section 15130)	Chapter 4
Effects Found not to be Significant (Section 15128)	Chapters 1, 4, and 5
Unavoidable Significant Environmental Impacts (Section 15126.2(b))	Chapters 4 and 5
Significant Irreversible Changes (Section 15126.2(c))	Chapter 5

Table 2-2: Required Environmental Impact Report Contents

Requirement (CEQA Section)	Location in EIR
Growth-Inducing Impacts (Section 15126.2(d))	Chapter 5
Alternatives to the Proposed Project (Section 15126.6)	Chapter 6
Organizations and Persons Consulted (Section 15129)	Chapter 8
List of Preparers (Section 15129)	Chapter 9
References (Section 15148)	Chapter 10

Key:
CEQA = California Environmental Quality Act
EIR = Environmental Impact Report

The content and organization of this EIR are designed to meet the requirements of CEQA and the *CEQA Guidelines*, as well as to present issues, analysis, mitigation, and other information in a logical and understandable way. This EIR is organized into the following sections:

- Chapter 1, *Executive Summary*, provides a summary of the project description and a summary of the environmental impacts and mitigation measures.
- Chapter 2, *Introduction*, provides CEQA compliance information, an overview of the decision-making process, organization of the EIR, and a responsible and trustee agency list.
- Chapter 3, *Project Description*, provides a description of the location, characteristics, and objectives of the projects, and the relationship of the projects to other plans and policies associated with the project.
- Chapter 4, *Environmental Setting*, *Impacts, and Mitigation Measures*, contains a detailed environmental analysis of the existing conditions, projects impacts, mitigation measures, and cumulative impacts.
- Chapter 5, *Consequences of Project Implementation*, presents an analysis of the project's cumulative and growth-inducing impacts and other CEQA requirements, including significant and unavoidable impacts and irreversible commitment of resources.
- Chapter 6, *Alternatives*, describes a reasonable range of alternatives to the projects that could reduce the significant environmental effects that cannot be avoided.
- Chapter 7, *Responses to Comments*, is reserved for responses to comments on the EIR.
- Chapter 8, *Organizations and Persons Consulted*, lists the organizations and persons contacted during preparation of this EIR.
- Chapter 9, *Preparers*, identifies persons involved in the preparation of the EIR.
- Chapter 10, *Bibliography*, identifies reference sources for the EIR.
- Appendices provide information and technical studies that support the environmental analysis contained within the EIR.

The analysis of each environmental category in Chapter 4 is organized as follows:

- "Introduction" provides a brief overview on the purpose of the section being analyzed with regards to the project.
- "Environmental Setting" describes the physical conditions that exist at this time and that may influence or affect the topic being analyzed.
- "Regulatory Setting" provides State and federal laws and the Kern County General Plan (KCGP) goals, policies, and implementation measures that apply to the topic being analyzed.
- "Impacts and Mitigation Measures" discusses the impacts of the projects in each category, presents the determination of the level of significance, and provides a discussion of feasible mitigation measures to reduce any impacts.
- "Cumulative Setting, Impacts, and Mitigation Measures" provides a discussion of the cumulative geographic area for each resource area, and analysis of whether the project would contribute to a significant cumulative impact, and if so, identifies cumulative mitigation measures.

2.6 Responsible and Trustee Agencies

Projects or actions undertaken by the lead agency, in this case, the KCPNR, may require subsequent oversight, approvals, or permits from other public agencies in order to be implemented. Other such agencies are referred to as "responsible agencies" and "trustee agencies." Pursuant to Sections 15381 (Responsible Agency) and 15386 (Trustee Agency) of the State *CEQA Guidelines*, as amended, responsible agencies and trustee agencies are defined as follows:

- A "responsible agency" is a public agency that proposes to carry out or approve a project, for which a lead agency is preparing or has prepared an EIR or Negative Declaration. For the purposes of CEQA, the term "responsible agency" includes all public agencies other than the lead agency that have discretionary approval power over the project (Section 15381).
- A "trustee agency" is a state agency having jurisdiction by law over natural resources affected by a project that are held in trust for the people of the State of California (Section 15386).

The various public, private, and political agencies and jurisdictions with a particular interest in the project include, but are not limited to, the following:

Federal Agencies

- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency

State Agencies

- California Air Resources Board
- California Department of Conservation, Geologic Energy Management Division
- California Department of Fish and Wildlife
- California Department of Public Health
- California Department of Toxic Substances Control
- California Energy Commission
- California Highway Patrol
- California Native American Heritage Commission
- California Office of Historic Preservation
- California State Lands Commission
- Governor's Office of Planning and Research
- Office of the State Fire Marshall
- Regional Water Quality Control Board, Central Valley District
- State Water Resources Control Board

Local Agencies

- San Joaquin Air Pollution Control District
- Kern Council of Governments
- Kern County Public Works Department, Operations Division
- Kern County Public Works Department, Engineering and Surveying Services Division
- Kern County Fire Department
- Kern County Planning and Natural Resources Department
- Kern County Public Health Services Department, Environmental Health Division
- Kern County Public Services Department, Development Review Division

- Kern County Planning Commission
- Kern County Board of Supervisors

2.7 Incorporation by Reference

In accordance with Section 15150 (Incorporation by Reference) of the State *CEQA Guidelines*, to reduce the size of the report, the following documents are hereby incorporated by reference into this EIR and are available for public review at the KCPNR. A brief synopsis of the scope and content of these documents is provided below.

Kern County General Plan

The KCGP is a policy document with planned land use maps and related information and is designed to give long-range guidance to those County officials making decisions affecting the growth and resources of the unincorporated Kern County jurisdiction, excluding the Metropolitan Bakersfield Planning Area. This document, adopted on June 14, 2004, and last amended on September 22, 2009, helps to ensure that day-to-day decisions conform to the long-range program designed to protect and further the public interest as related to the County's growth and development and to mitigate environmental impacts. The KCGP also serves as a guide to the private sector of the economy in relating its development initiatives to the County's public plans, objectives, and policies.

Kern County Zoning Ordinance

According to Chapter 19.02.020, Purposes, Title 19 was adopted to promote and protect the public health, safety, and welfare through the orderly regulation of land uses throughout the unincorporated area of the County. Further, the purposes of this title are to:

- Provide the economic and social advantages resulting from an orderly planned use of land resources.
- Encourage and guide development consistent with the KCGP.
- Divide Kern County into Zoning Districts of a number, size, and location deemed necessary to carry out the purposes of the KCGP and this title.
- Regulate the size and use of lots, yards, and other open spaces.
- Regulate the use, location, height, bulk, and size of buildings and structures.
- Regulate the intensity of land use.
- Regulate the density of population in residential areas.
- Establish requirements for off-street parking.

- Regulate signs and billboards.
- Provide for the enforcement of the regulations of Chapter 19.02.

Kern County Oil and Gas Ordinance (2021) and Final Supplemental Recirculated EIR

Kern County has previously developed revisions to the Kern County Zoning Ordinance for local permitting for oil and gas, focused on Chapter 19.98 (Oil and Gas Production), referred to as the "Oil and Gas Ordinance." The Oil and Gas Ordinance establishes updated development and implementation standards and conditions to address environmental impacts of oil and gas development activities, and new ministerial permit procedures for County approval of future well drilling and operations, to ensure compliance with the updated development and implementation standards and conditions and provide for ongoing tracking and compliance monitoring. Potential impacts of oil and gas development under the Oil and Gas Ordinance were evaluated in the *Final Environmental Impact Report–Revisions to the Kern County Zoning Ordinance– 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental and Recirculated EIR certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). On March 22, 2024, the County issued a Notice of Preparation for a Second Supplemental Recirculated EIR (SSREIR) to address three CEQA issues identified in a March 7, 2024, Court of Appeal decision. As ordered by the Court, the County has continued to suspend permitting under the Oil and Gas Ordinance until the SSREIR is certified and the ordinance is re-adopted.

The Oil and Gas EIR is incorporated by reference in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. As described in the Oil and Gas EIR, oil and gas activities consist of:

- Construction activities, including well pad and access road construction, well drilling, well completion and testing, distribution line construction, well reworking and workovers, well decommissioning, and well abandonment, and construction of ancillary facilities such as pipelines and tanks; and

- Operational activities, including produced fluids and natural gas treatment, water management, well stimulation treatment, enhanced oil recovery activities, and water and waste gas injection via injection wells, operation of ancillary facilities, and well and ancillary facility maintenance.

Significant cumulative impacts of oil and gas activities identified in the Oil and Gas EIR include impacts to aesthetics, agriculture and forest resources, air quality, biological resources, cultural resources, greenhouse gases, hydrology and water quality, and utilities and services (water supply). Each of these contributions to cumulative impacts from past, present, and reasonably foreseeable future oil and gas development may occur together with those of CTV I.

2.8 Sources

This EIR is dependent upon information from many sources. Some sources are studies or reports that have been prepared specifically for this document. Other sources provide background information related to one or more issue areas that are discussed in this document. The sources and references used in the preparation of this EIR are listed in Chapter 10, *Bibliography*, and are available for review by appointment during normal business hours at:

Kern County Planning and Natural Resources Department
2700 "M" Street, Suite 100
Bakersfield, California 93301-2370
Contact: Keith Alvidrez, Lead Planner
alvidrezk@kerncounty.com

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Chapter 3

Project Description

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Chapter 3
Project Description

3.1 Project Overview

This Environmental Impact Report (EIR) has been prepared to identify and evaluate potential environmental impacts associated with implementation of the proposed Carbon TerraVault I (Kern County) Project (CTV I, or the project) by California Resources Corporation (CRC, or the project proponent, or the applicant). The project is the consideration of the approval of multiple Conditional Use Permits (CUPs) (CUP No. 13 Map No. 118, CUP No. 14 Map No. 118, CUP No. 5 Map 119, CUP No. 6 Map 119, CUP No. 3, Map 120, CUP No. 2 Map No. 138) for the construction and operation of an approximately 9,104-acre carbon capture and storage (CCS) facility with related capture facilities and pipeline for the initial source and request associated Zone Change Cases (ZCC No. 5, Map 119 and ZCC No. 4, Map 120) from A-1 (Limited Agriculture) to A (Exclusive Agriculture) on approximately 6,160 acres. The facility consists of proposed U.S. Environmental Protection Agency (EPA) Class VI Underground Injection Control (UIC) wells, approximately 11 miles of underground facility and injection pipeline for capture from the pre-combustion gas, and related infrastructure improvements for the capture, transfer, and storage of carbon dioxide (CO_2). The land acreage of the CCS Land Surface Area, which comprises the CUPs being considered, has been reduced from the original 9,130 acres to 9,104 acres through changes in the location of the facility on-site pipeline.

The process of CCS involves capturing carbon from the atmosphere or an emitting industrial facility and storing (sequestering) it underground (for example, in a depleted oil and gas field). Once injected, the CO_2 remains in the reservoir permanently due to the overlying Reef Ridge confining shale. Once injected, underground carbon is considered stored (sequestered) for thousands of years. Other types of carbon storage involve nonmechanical operations such as regenerative agriculture or creating products from the captured CO_2.

The source of CO_2 for injection as part of this project would be the pre-combustion Elk Hills field gas, from which CO_2 is captured and processed at the existing cryogenic and fractionation natural gas plant (CGP-1) facility and Elk Hills Power Plant within the Elk Hills oil field (Elk Hills). No additional sources of CO_2 (from outside Elk Hills) or other new development are proposed for the CCS Surface Land Area or injection into the project.

Currently, Elk Hills gas provides the fuel for the 550 megawatt (MW) Elk Hills Power plant that provides electricity for both oilfield operations and the California wide power system. Each of the five locations of collection and the six proposed sites of injection within the CUP boundary would be limited to less than 1 acre each (facilities). The remaining acreage included in the CUP boundary comprises the pore space underground for mineralization of the CO_2 through natural effects into the empty spaces in the rock and long-term storage (Approved Storage Area), the land on the surface over the pore space or area of disturbance (CCS Surface Land Area), and the underground

facility pipeline. The CUP boundary correlates to any parcel on which proposed CCS facilities would be constructed or operated, including the proposed storage area.

The project would be developed in two phases for capture site infrastructure: facility pipelines and injection wells. A total of six Class VI UIC injection wells would be installed. Phase 1 wells (26 Reservoir) would consist of three new wells plus one modified existing well, and Phase 2 wells (A1A2 Reservoir) would consist of two modified Class II wells originally used for enhanced oil recovery. Additionally, 10 existing wells would be converted to monitoring wells, and six existing wells would be converted into seismic monitoring wells.

The project requires approval of a Zone Change Case (ZCC No. 5, Map No. 119; and ZCC No. 4, Map No. 120) from A-1 (Limited Agriculture) to A (Exclusive Agriculture).

The proposed project site is located within Elk Hills, which comprises a 75-square mile (47,800-acre) complex in the San Joaquin Valley of unincorporated Kern County (see Figure 3-1). The site, which contains parcels owned privately by CRC, is located on the west side of Elk Hills Road and to the north side of Skyline Road, within the administrative boundary of Elk Hills. The site can be accessed through the primary gated security entrance to Elk Hills at the western intersection of Skyline Drive and Elk Hills Road and via private oilfield roads. The boundaries of the CCS Surface Land Area and Underground Approved Storage Area (pore space) for the project area are approximately 26 miles from Bakersfield city center, approximately 8.5 miles from the city of Taft, approximately 5 miles from the unincorporated community of Tupman, and approximately 4 miles from the unincorporated community of Buttonwillow. The closest injection well or capture facility site is approximately 26 miles from the Bakersfield city center, approximately 8.5 miles from the city of Taft, 6 miles from the unincorporated community of Buttonwillow, approximately 6 miles from the unincorporated community of Tupman, and 4.5 miles from McKittrick. The surrounding area is composed of agricultural fields, both active and fallow, and other existing oilfields including the Midway/Sunset oilfield, McKittrick oilfield, and Cymric oilfield.

The proposed project at full operation is designed to store up to 1.46 million tons of concentrated CO_2 in 26R during Phase 1 (up to 26 years), and up to 750,000 tons of concentrated CO_2 in A1A2 in Phase 2 for a total of 2,210,000 tons capacity for injection. As part of Phase 1, 101,743 tons per year (tpy) of compressed CO_2 would be captured and injected, and as part of Phase 2, up to 101,743 tpy of compressed CO_2 would be captured and injected, for a total of up to 203,485 tpy from the initial source-captured pre-combustion gas associated with Elk Hills oilfield.

Currently, natural gas is extracted, along with crude oil and reservoir formation water (produced water), from various production wells throughout the 110-year-old Elk Hills oilfield prior to processing in the existing CGP-1. These products are transported by field gathering lines to an expansive network of separation facilities within the oilfield and are divided into three concentrated streams or flows of raw material: natural gas, crude oil, and produced water. The proposed project would capture CO_2 from the existing produced natural gas streams that occur from existing oilfield operations.

Figure 3-1: Regional Location

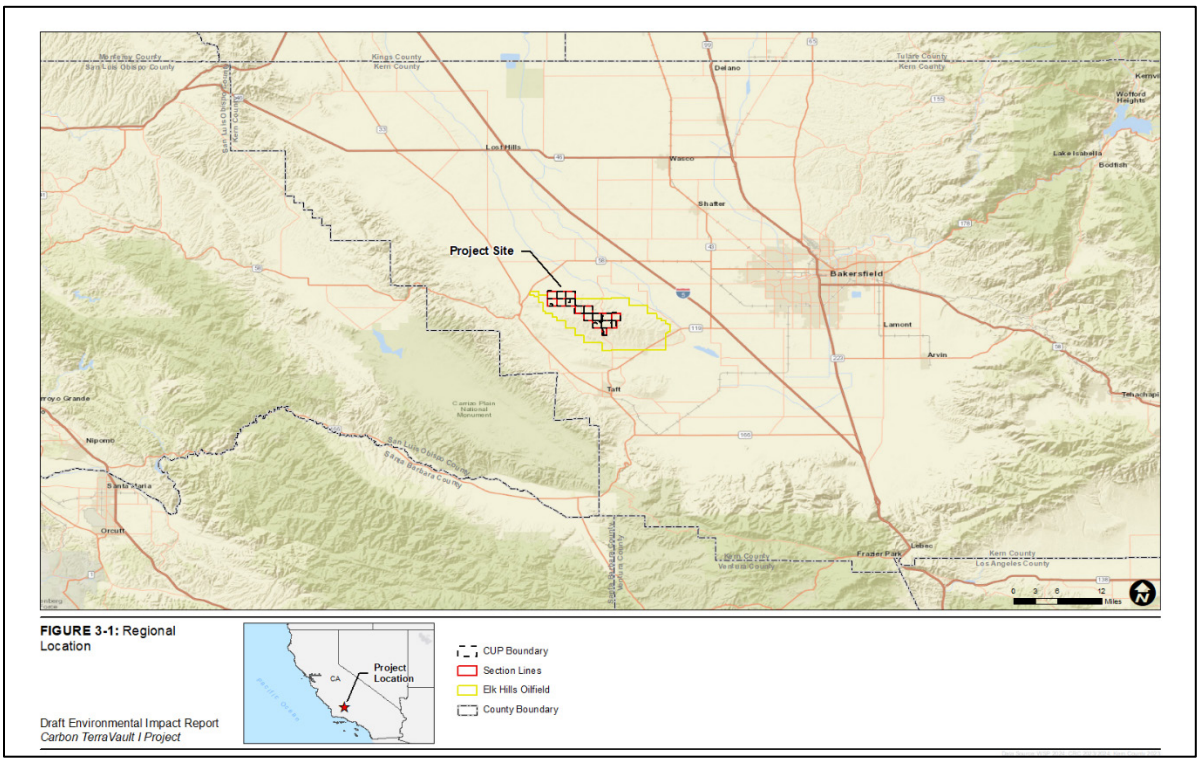


FIGURE 3-1: Regional Location

Draft Environmental Impact Report
Carbon TerraVault I Project

As previously stated, a portion of that natural gas provides the fuel for the 550 MW Elk Hills Power plant that provides electricity for both oilfield operations and the California wide power system. The Elk Hills Power plant provides about one-third of its power for oilfield operations and the remainder is distributed to the California power grid via the Pacific Gas and Electric (PG&E) substation in Buttonwillow. The plant was certified through the California Energy Commission process on December 6, 2000, and began commercial operation on July 24, 2003.

The captured CO_2 would then be transported by underground facility pipeline to the dedicated Class VI UIC wells for the project, all of which would be located within the CUP boundary. The CO_2 would be injected into the identified geographically confined reservoirs for storage, permanently.

3.2 Proposed Project

3.2.1 Discretionary Actions

The proposed project requires the following approvals from the Kern County:

- Zone Change Case (ZCC No. 5, Map 119 and ZCC No. 4, Map 120): From A-1 (Limited Agriculture) to A (Exclusive Agriculture) on approximately 6,160 acres (see Table 3-1)
- Issuance of multiple CUPs (CUP No. 13 Map No. 118, CUP No. 14 Map No. 118, CUP No. 5 Map 119, CUP No. 6 Map 119, CUP No. 3, Map 120, CUP No. 2 Map No. 138) to

allow for the construction and operation of the CCS facility on approximately 9,104 acres with site installation of six Class VI UIC injection wells, conversion of 10 existing oil wells into monitoring wells, conversion of six existing oil wells into seismic wells, and construction of accessory infrastructure with a CO_2 storage capacity of 48 million metric tons within the A (Exclusive Agriculture) Zone District

Class VI UIC wells are permitted through the EPA Pacific Southwest (Region 9) Class VI UIC Permit (Carbon TerraVault I 26-R and Carbon TerraVault I A1A2), which is in process to cover permitting of the injection wells and Area of Review (AoR). Class VI UIC wells are used for injection of CO_2 into underground subsurface rock formations for long-term geologic storage. The Class VI UIC permit, which includes analysis and operation of the underground storage formation cannot be constructed or used until the project is approved and permitted under local zoning regulations.

The CUP public hearing process will consider all parts of the project implementation and standards, including compliance with the EPA's Class VI UIC mandate (as defined in Title 40 of the Code of Federal Regulations (CFR) (40 CFR 146.81)) of the consideration of a variety of measures to assure that injection activities would not endanger underground sources of drinking water (USDW). The concept of endangerment is defined in 40 CFR 144.12.

CCS has been determined under County Code Section 19.08.085 – Alternative to Determination of Similar Use, to be a storage operation and not a manufacturing operation, which can be processed for consideration through the CUP process (Section 19.102). Under this determination, made with the authority granted to the Planning Director in Section 19.06.020, storage of CO_2, in either existing formations or tanks for transport and disposal or use, is an allowed use with the processing and approval of a CUP in the following districts:

- A (Exclusive Agriculture) District (Resource Extraction and Energy Development Uses)
- M-2 (Medium Industrial) District (Resource Extraction and Energy Development Uses)
- M-3 (Heavy Industrial) District (Resource Extraction and Energy Development Uses)

As portions of the underground pore space required for storage has surface land that is currently zoned A-1 (Limited Agriculture), a zone change to A (Exclusive Agriculture) is required for consistency with the Kern County General Plan (KCGP) and conformance with this determination.

Table 3-1, below, identifies the individual parcels, their respective assessor parcel numbers (APN), acreages, and existing general plan and zoning designations, along with proposed zoning for each parcel within the project area.

Table 3-1: Project Assessor Parcel Numbers, General Plan Map Codes, Zoning, and Acreage

APN	General Plan Map Codes	Existing Zoning	Proposed Zoning	Acres	Ag Preserve Inclusion	Conservation Area
Carbon Capture and Storage Facility						
157-070-03	8.3 and 8.3/2.1	A	A	80	Ag Preserve No. 3	
157-060-02	8.4	A	A	640	Ag Preserve No. 3	Elk Hill Conservation Easement
158-040-07	8.3 and 8.3/2.1	A	A	640.8	Ag Preserve No. 3	
158-070-02	8.3	A-1	A	160		
158-070-03	8.4	A-1	A	464.49		
158-070-01	8.4	A-1	A	640.64		
158-070-05	8.4	A-1	A	640		
158-080-06	8.4	A-1	A	640		
158-090-03	8.4	A-1	A	680.9		
158-090-02	8.4	A-1	A	640		
158-090-01	8.4	A-1	A	640		
158-090-07	8.4	A-1	A	0.92		
158-090-16	8.4	A-1	A	14.78		
158-090-18	8.4	A	A	20.96		
158-090-19	8.4	A	A	590.61		
158-090-04	8.4	A	A	682.86		
159-280-01	8.4	A-1	A	644.48		
159-280-07	8.4 and 8.4/2.4	A-1	A	325.37		
298-010-07	8.4	A	A	314.45		
Carbon Capture and Storage Facility Acreage Subtotal				9,101.26		

Table 3-1: Project Assessor Parcel Numbers, General Plan Map Codes, Zoning, and Acreage

APN	General Plan Map Codes	Existing Zoning	Proposed Zoning	Acres	Ag Preserve Inclusion	Conservation Area
Underground Facility Pipeline						
158-070-04	8.4	A-1	A-1	2.99[(a)]		
Underground Facility Pipeline Acreage Subtotal				2.99		
Project Parcels Total				**9,104**		

Notes:
[(a)] Portion of APNs included in the 50-foot pipeline corridor.
Land Use Designation:
2.1 = Seismic Hazard
2.4 = Steep Slope
8.3 = Extensive Agriculture (minimum 20-Acre Parcel Size)
8.4 = Mineral and Petroleum
Zone Designation:
A = Exclusive Agriculture
A-1 = Limited Agriculture
Key:
Ag = Agriculture
APN = assessor parcel number

3.2.2 Project Objectives – Applicant

The following are the applicant's project objectives:

- Construct and operate a permanent underground storage facility to develop and use existing CO_2 storage capacity at Elk Hills in an economically feasible manner.
- Contribute to CRC's adopted goals of Full-Scope Net Zero emissions for Scope 1 (direct greenhouse gas emissions), Scope 2 (indirect greenhouse gas emissions associated with the purchase of electricity/steam/heat/cooling) and Scope 3 (all other indirect greenhouse gas emissions resulting from the company's business operations) emissions by 2045 by capturing and storing CO_2 emissions from CRC's Elk Hills field gas operations.
- Support California's Executive Order B-55-18, for California to achieve carbon neutrality by 2045 and net negative emissions thereafter.
- Site and design the project in an environmentally responsible manner consistent with current Kern County and California guidelines.
- Promote economic development and bring living-wage jobs to Kern County.

3.3 Environmental Setting

Regional Setting

The project area encompasses land located in the Central Valley portion of the unincorporated area of Kern County, California. Elk Hills oilfield is located 26 miles southwest of Bakersfield city center in western unincorporated Kern County, California. The project would be located on the west side of Elk Hills Road and north Side of Skyline Road, within Elk Hills (Figure 3-1). The surrounding area comprises agricultural fields, both active and fallow, and other existing oil fields. They include the Midway/Sunset Oilfield, McKittrick Oilfield, and Cymric Oilfield. Skyline Road is closed to public entry and forms the southern boundary of the project. Skyline Road connects to Elk Hills Road, which connects the city of Taft, to the south, with Buttonwillow to the north. CRC's gated and guarded entrance to the field is located at the western intersection of Skyline Drive and Elk Hills Road.

The nearest urbanized areas to the boundary of the CCS Surface Land Area and Underground Approved Storage Area (pore space) for the project area are Bakersfield city center (approximately 26 miles), the city of Taft (approximately 8.5 miles), the unincorporated community of Tupman (approximately 5 miles), and the unincorporated community of Buttonwillow (approximately 4 miles). The closest community to the injection and capture facilities is McKittrick, 4.5 miles away. There are no residential structures within the boundary of the CUP CCS Surface Land Area. The project site is crossed by public utilities, including several PG&E electric transmission lines over the eastern portion of the project site.

Surrounding Land Use, General Plan, and Zoning Designations

The project site is located within Elk Hills, which comprises an approximately 75-square-mile (47,800-acre) area used for oil and gas exploration and production. Table 3-2 identifies the existing Land Use designations, Adopted General Plan Map Code Designations, and Existing Zoning for the project site and for areas north, south, east, and west of the project site.

Table 3-2: Surrounding Land Use, General Plan Map Code designations, and Zoning

Location	Existing Land Use	Adopted General Plan Map Code Designations	Existing Zoning
Project Site	Oil and Gas Exploration and Production	8.3 (Extensive Agriculture. 8.3/ 2.1 (Extensive Agriculture Seismic Hazard Overlay) 8.4 (Mineral and Petroleum)	A (Exclusive Agriculture) A-1 (Limited Agriculture)
North	Oil and Gas Exploration and Production. Oil and Gas Ancillary Services Undeveloped Private Lands	1.1 (State or Federal Land) 3.3 (Other Facilities) 8.1/2.3 (Intensive Agriculture and Shallow Ground Water) 8.3 (Extensive Agriculture) 8.3/2.1 (Extensive Agriculture and Seismic Hazard) 8.4 (Mineral and Petroleum)	A (Exclusive Agriculture) A-1 (Limited Agriculture) PL RS MH (Platted Lands, Residential Suburban Combining, Mobile home Combining) AH (Exclusive Agriculture, Airport Approach Height Combining)
South	Oil and Gas Exploration and Production	1.1 (State or Federal Land) 8.4 (Mineral and Petroleum) 8.3 (Extensive Agriculture)	A (Exclusive Agriculture)
East	Oil and Gas Exploration and Production	8.3 (Extensive Agriculture) 8.4/2.4 (Mineral and Petroleum and Steep Slope)	A (Exclusive Agriculture) A-1 (Limited Agriculture) A-1 H (Limited Agriculture, Airport Approach Height Combining)
West	Oil and Gas Exploration and Production	1.1 (State or Federal Land) 8.3 (Extensive Agriculture) 8.3/2.1 (Extensive Agriculture and Seismic Hazard) 8.3/2.5 (Extensive Agriculture and Flood Hazard) 8.4 (Mineral and Petroleum) 8.5 (Resource Management)	A (Exclusive Agriculture)

Surrounding Land Use

Existing land use in the vicinity of the project site generally includes oil and gas exploration and production and agricultural lands. The closest sensitive receptor to the project site is McKittrick Elementary School, which is located 4.5 miles from injection well 357-7R and the injection pipeline. The nearest residence is approximately 4.4 miles from injection well 345-36R and the

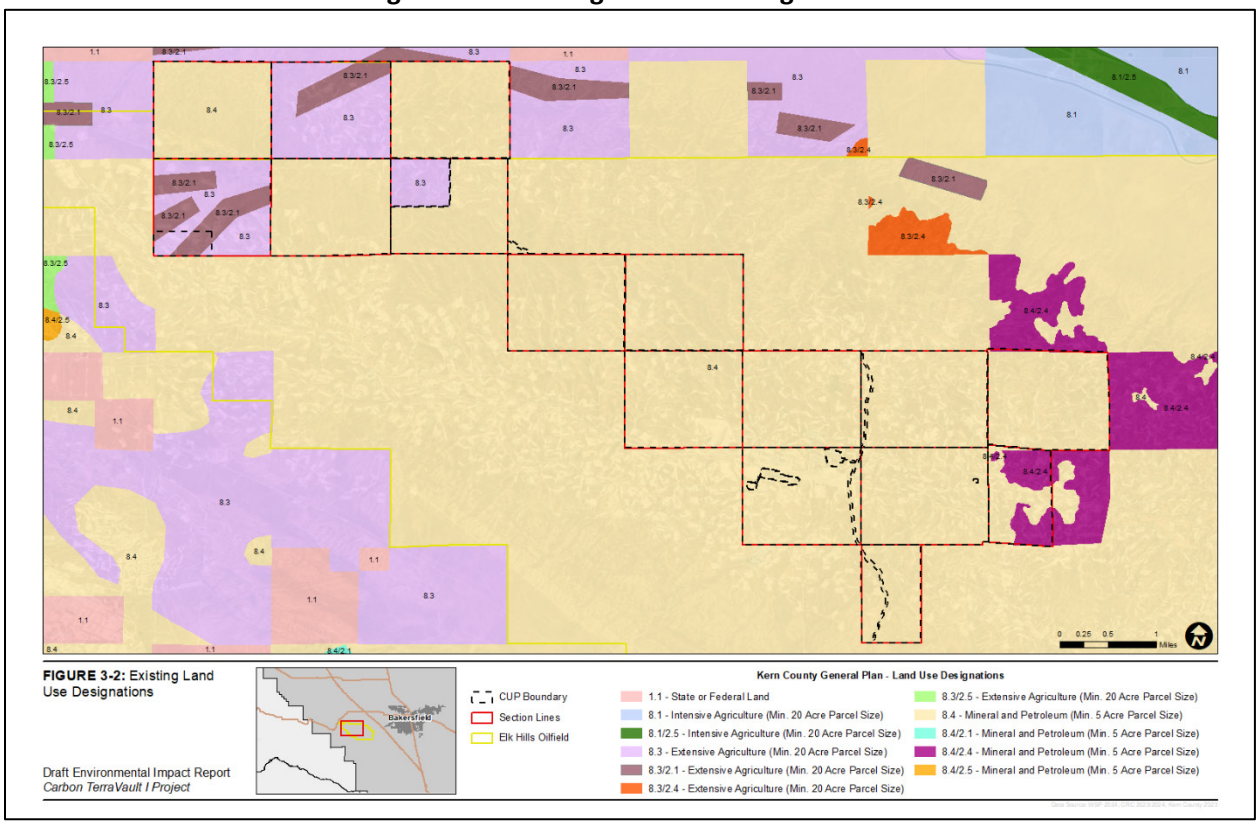
injection pipeline. Buttonwillow Recreation and Park District is located approximately 6.8 miles northeast of injection well 355-7R and 6.5 miles from the injection pipeline. Schools nearby to the project site are listed in Table 3-3, and Figure 3-2 shows existing land use designations. See Section 4.11, *Land Use and Planning*, for mapping and additional information.

Table 3-3: Schools near the Project Site

School Name	Student Population (2022–2023)	District	Distance to CUP Boundary (miles)	Distance to Closest Injection Well (miles)	Distance to Closest Facility Pipeline (miles)
McKittrick Elementary School	79	McKittrick Elementary	2.78	4.47	4.47
Buttonwillow Elementary School	313	Buttonwillow Union Elementary	4.85	6.15	5.81
Elk Hills Elementary School	163	Elk Hills Elementary School	4.21	6.05	6.05
Midway Elementary	85	Midway Elementary	7.04	8.11	7.98
Jefferson Elementary	243	Taft City	6.73	8.15	8.13
Taft Primary	247	Taft City	7.61	9.02	9.01
Roosevelt Elementary	475	Taft City	7.29	8.65	8.63
Parkview Elementary	330	Taft City	8.00	9.45	9.35
Conley Elementary	312	Taft City	8.48	9.95	9.87
Lincoln Junior High	795	Taft City	7.28	8.75	8.63
Taft Union High	1,102	Taft Union High	7.36	8.83	8.78
Buena Vista High (Continuation)	84	Taft Union High	7.10	8.59	8.54
Taft College	3,943	West Kern Community College	7.15	8.51	8.55

Key:
CUP = Conditional Use Permit

Figure 3-2: Existing Land Use Designations



Mineral Use Zones

The project site is within an oilfield designated by the State of California and the KCGP for mineral and petroleum resource and resource uses. Oil and gas exploration and extraction are permitted uses in the A (Exclusive Agriculture) and A-1 (Limited Agriculture) zones. See Section 4.12, *Mineral Resources*, for mapping and additional information.

Farmland

The project site is not designated by the California Department of Conservation as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland. The project site is designated Urban Built-Up Land and Vacant or Disturbed Land. There is land designated as Non-Prime Farmland, which is subject to a Williamson Act land Use Contract for grazing immediately adjacent to the project site. No land within the project footprint is subject to a Williamson Act Land Use contract. See Section 4.2, *Agricultural Resources*, for mapping and additional information.

Existing On-Site Conditions

The existing area is currently an active oil field, with 344 wells being managed at Elk Hills. Of these wells, 143 are active, 125 are idle, and 76 are abandoned. Table 3-4 provides a summary of existing wells within each proposed storage reservoir.

Table 3-4: Existing Wells at Elk Hills Oilfield

Wellbore Counts	Active	Idle	Abandoned	Permitted, Not Drilled
A1A2 (within the CO_2 Plume)	41	70	39	0
26R (within the CO_2 plume)	102	65	37	0
Combined	143	125	76	0

Key:
CO_2 = carbon dioxide

Public Services

The proposed project would be served by the Kern County Sheriff's Department for law enforcement and public safety services, with the closest substation being the Taft Area Substation, located at 315 N. Lincoln Street. Fire protection and emergency medical services would be provided by the Kern County Fire Department, with the closest station being Fire Station #25, located at 100 Mirasol Avenue, and Kern County Emergency Medical Services for medical care and emergency services.

The nearest public airport to the project site is the Elk Hills - Buttonwillow Airport located adjacent to the northeast corner of the project. The project site is located entirely outside of the Elk Hills-Buttonwillow Airport Land Use Compatibility Plan. See Section 4.14, *Public Services*, for mapping and additional information.

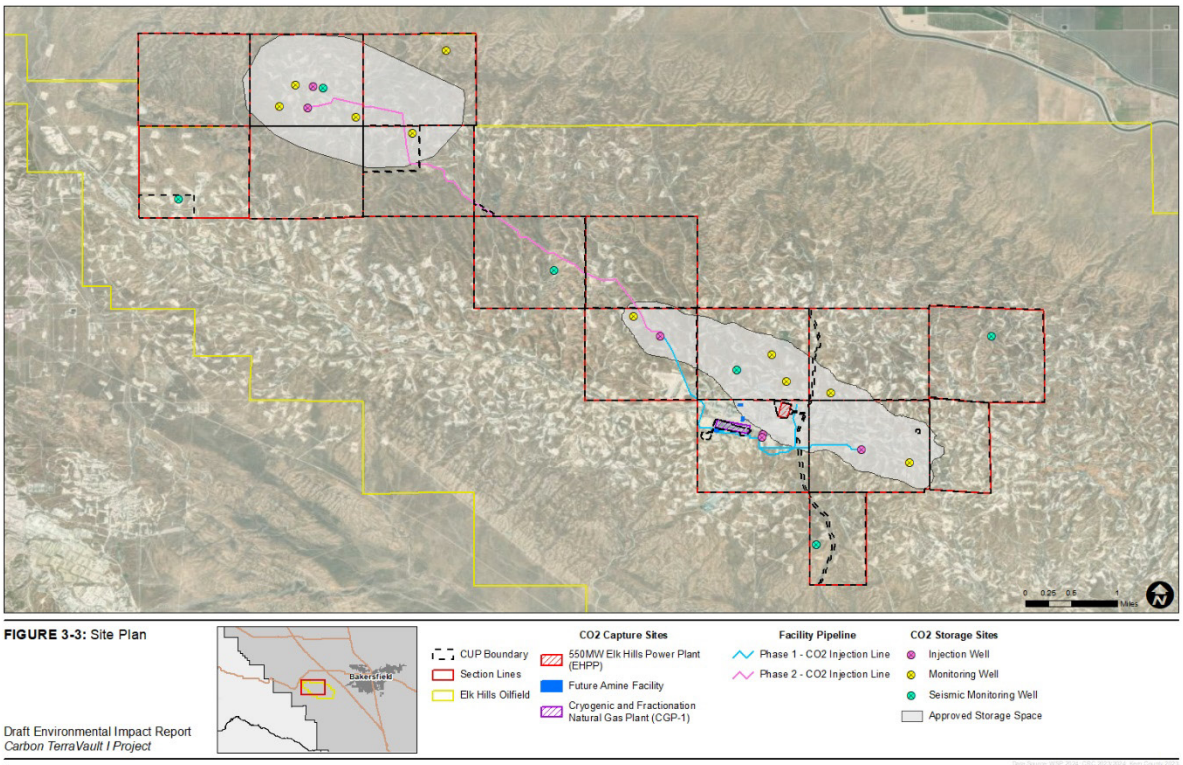
Site Access

Primary access to the project site would be via existing access at the western intersection of Skyline Drive and Elk Hills Road. The access road connects to a network of existing private oilfield roads within Elk Hills and would provide access to the injection wells and accessory facilities and infrastructure.

3.4 Proposed Project Characteristics

Project elements are shown on Figure 3-3 and include: capture facilities, facility pipelines, and injection and monitoring wells (including seismic monitoring wells), described in detail in the following sections.

Figure 3-3: Site Plan



3.4.1 CO_2 Capture Sites

Source of CO_2

The source of CO_2 for injection as part of this project (the initial source) would be the pre-combustion Elk Hills gas, which is captured and processed at the existing cryogenic and fractionation natural gas plant (CGP-1) facility constructed and operating at Elk Hills since 2013, along with the Elk Hills Power Plant. No additional sources of CO_2 or new development are proposed for the CCS Surface Land Area.

Two identical capture, compression, and pumping facilities would be constructed adjacent to the existing CGP-1 facility to capture up to 101,743 tpy of concentrated CO_2 in Phase 1 (up to 26 years), and 101,743 tpy of concentrated CO_2 in Phase 2, from the produced natural gas streams associated with Elk Hills field gas prior to processing in the CGP-1. There are five locations of natural gas collection, which tie in together in Section 26R just northwest of CGP-1 and then are transported via an existing 20-inch line into the plant.

The natural gas is currently extracted along with crude oil and reservoir formation water, in production wells throughout the 110-year-old oil field and sent via field gathering lines into a network of separation facilities located throughout Elk Hills, where the products are separated into three concentrated streams of natural gas, crude oil, and produced water. The produced water is

returned to the reservoir(s) from which it was produced via Class II water injection wells. The crude oil goes to larger gathering systems and ultimately on to sales facilities.

The majority of the natural gas goes to the CGP-1 plant for further processing and separation into separate product components prior to sales, gas injection wells throughout Elk Hills used for reservoir pressure management, or for use as a fuel supply for the nearby 550 MW Elk Hills Power Plant. The power plan provides about one-third of its power to Elk Hills and the other two-thirds onto the California power grid via an on-site switching station and twin 230 kilowatt conductors running north to the PG&E substation in Buttonwillow (approximately 8.5 miles north of the Elk Hills Power Plant).

Future Sources – Identification

The proposed project is the permitting of the full CCS area with the injection and monitoring wells required for operation. Only one source has been identified and is analyzed in this EIR: existing Elk Hills field gas streams in specific locations. That operation, which is related to oilfield operations, will not provide enough captured CO_2 to produce the maximum injection capacity of 2,150,000 tons per year for which the project is being permitted in two EPA permits for the oil and gas reservoirs (26R and/or A1A2) for permanent sequestration. Additional existing and new CO_2 sources, completely outside the CCS boundary of 9,104 acres, will need to be permitted and conveyed to CTV I for permanent underground storage. No additional infrastructure, such as larger CO_2 pipelines, have been included in this project for such future uses.

The future project sources will be limited to the industries and locations listed below; a general description of these types of industries can be found in the technical memorandum on sources provided in Appendix K-4:

- Location only within Kern County
- Hydrogen – green and blue
- Biomass carbon removal and storage (BiCRS)
- Cement production
- Green steel production
- Oilfield field gas streams
- Power plants
- Direct air capture
- Alternative fuel production

All projects in unincorporated Kern County will require approval of the base industry in an appropriately zoned parcel, with CO_2 capture and transport requiring an additional CUP and EIR for compliance with the California Environmental Quality Act (CEQA). All CO_2 pipelines also require a CUP and EIR for compliance with CEQA. CO_2 from a source in an incorporated city in Kern County must show compliance with the preparation of an environmental document, with Kern

County as a responsible agency and not an exemption from such review. Further, the applicant has announced in the media the future on-site co-location of industries that would be sources of CO_2 as the development of a "clean energy" or "net zero" park.

Any such project will require approval from the Kern County Board of Supervisors and a public process under CEQA for a full EIR.

The applicant (CRC) and the listed companies have announced contractual relationships or interest in locating on CRC properties outside CTV I project boundary or sending CO_2 for injection at CTV I. CTV I has entered into Carbon Dioxide Management Agreements (CDMAs) with proponents of various types of facilities where there is a preliminary expectation that they would be constructed and operated on site at Elk Hills and produce CO_2 emissions that would be captured, transported and injected into the depleted oil and gas reservoirs (26R and/or A1A2) for permanent sequestration. These agreements include non-binding commitments by the facility proponent to conduct a front-end-engineering and design (FEED) study to evaluate the feasibility of locating the proposed facility at Elk Hills and by CTV I to provide access and use rights to construct and operate the facility. They also include preliminary agreements by the facility proponent to pay CTV I for accepting and sequestering at the CTV I storage complex specified volumes of CO_2 emitted from the facility. However, there are significant conditions precedent that must be met before any final binding agreements between CRC and third parties would be executed, and there is currently uncertainty associated with if, when, and what will be approved by the Kern County Board of Supervisors after a full review under CEQA, constructed and operated associated with these specific greenfield facilities. The Golden State Hydrogen Project has identified in the media, the CTV I Project as a potential temporary storage location for CO_2 generated by hydrogen production, until a CO_2 storage facility in Tulare County is constructed. CRC has not entered into a CDMA with the Golden State Hydrogen Project applicant for storage of CO_2 from that project, and project conditions will not permit a source outside Kern County for CTV I.

The draft EPA permit identified two other sources—Lone Cypress Blue Hydrogen and Avnos for characterization of the CO_2 stream. Such an EPA action does not mean the projects are approved, and there are no applications pending before the County for analyze.

Companies that have publicly indicated their interest in sending CO_2 to the project are generally described below. All information has been provided by the applicant, and the County is not party to any financial agreements or any confidentiality agreements regarding these specific companies. If and when any such sources of CO_2 emissions are advanced further, a separate CUP and associated environmental review process would accompany each project, including its infrastructure for CO_2 conveyance to the Project. Therefore, these projects are not required to be analyzed further in this EIR as approval of the project does not compel approval, nor presume completion, of any other of the contemplated projects, no applications of these other projects are pending before the county,

and there is not otherwise sufficient information available to allow for meaningful environmental review of the other projects at this time.

1. *Direct Air Capture (DAC)*. It is unknown if there is an existing CDMA or other commercial agreement between CRC and Avnos. The applicant notes that CTV I is in preliminary commercial discussions with Avnos, Inc., to construct a DAC facility that would be designed to intake and process atmospheric air to separate out CO_2. Through this process, the current expectation is that less than 95% of the CO_2 would be separated from the air stream in volumes up to 8 metric tonnes per day that will be captured, compressed to super-critical state, and piped for underground storage. The expectation is that the remaining 5 percent of CO_2 will be re-released into the atmosphere.
2. *Hydrogen*: Lone Cypress Energy Services, LLC, has entered a CDMA to explore development of a clean hydrogen production plant that would produce hydrogen using a steam methane reforming (SMR) process, likely using natural gas and potentially renewable natural gas as feedstock. CO_2 produced as a by-product of the SMR reaction would be captured for underground storage. While an application for the project was submitted to the County (the Elk Hills Blue Hydrogen Project by Lone Cypress Energy Service) and a Notice of Preparation was released in February, 2024, the project applicant has withdrawn the application.
3. *Elk Hills Power Plant CO_2 Emissions*. The Elk Hills Power Plant, an existing, operating 550 MW natural gas, combined-cycle power plant, located on site at Elk Hills is owned and operated by CRC. CTV I's CalCapture project would explore capturing CO_2 emissions from the Elk Hills Power Plant for sequestration in one of the CTV I reservoirs (26R and/or A1A2).
4. *Dimethyl Ether*. InEnTec Inc. has entered a CDMA to explore development of a facility that would produce renewable dimethyl ether (rDME) from local sources of agricultural waste. CO_2 emissions from the rDME production process would be captured for underground storage.
5. *Renewable Gasoline*. Verde Clean Fuels has entered a CDMA to explore development of a facility that would produce renewable gasoline using local sources of agricultural waste as a feedstock. CO_2 emissions from the renewable gasoline production process would be captured for underground storage.
6. *Renewable Natural Gas (RNG)*. NLC Energy has entered a CDMA to explore development of a facility that would produce RNG using local sources of agricultural waste as a feedstock. CO_2 emissions from the RNG production process would be captured for underground storage. RNG produced at the facility would likely be injected into a local natural gas pipeline network for sale and use throughout California as a low-carbon fuel.

Capture Technology

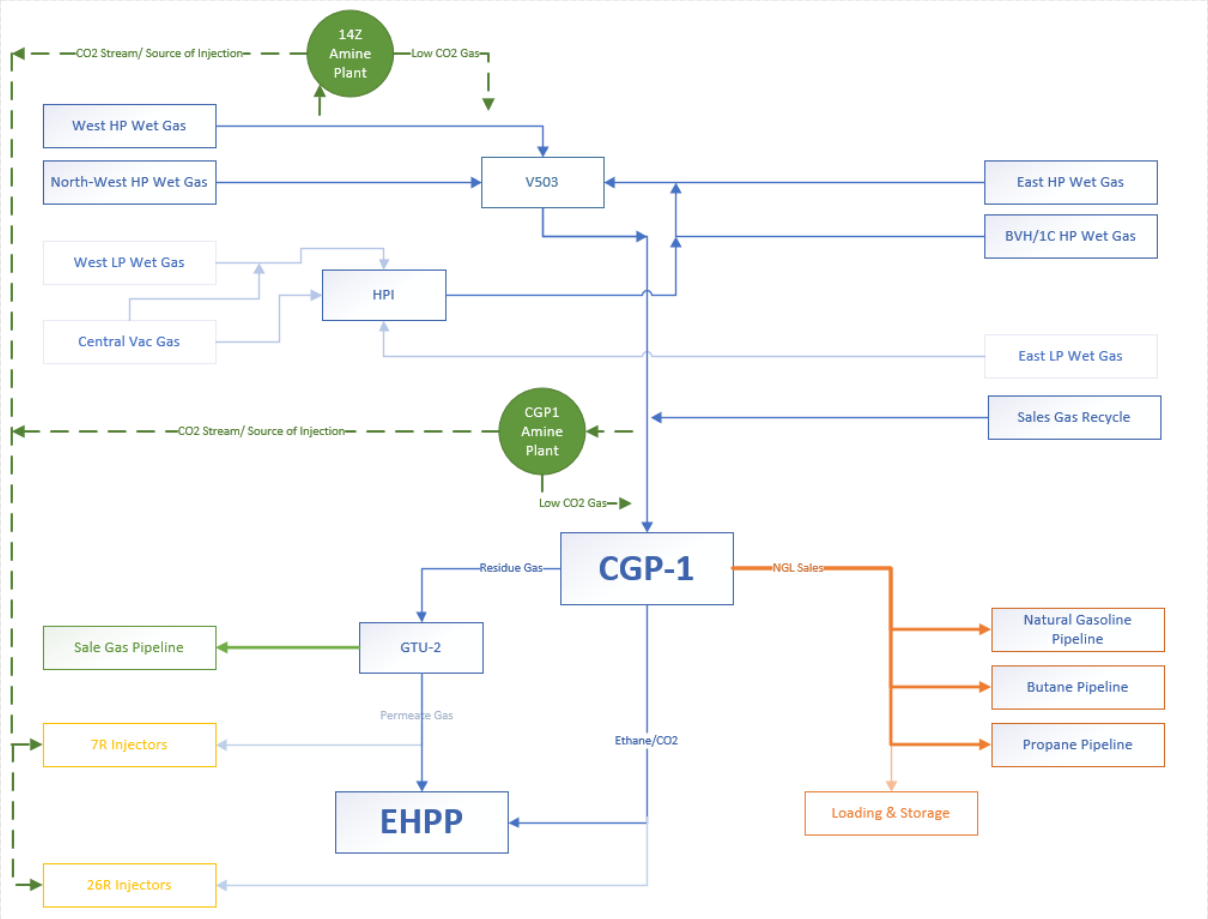
The project would use chemical solvents, specifically amine absorption, as the process of choice for this project. Amine treating is a critical process for enhancing the safety and reliability of natural gas by reducing its acid gas content. It employs reversible chemical reactions for the effective

removal and recovery of CO_2 contaminants. Natural gas often contains contaminants such as hydrogen sulfide (H_2S) CO_2, commonly termed "acid gases." These impurities not only pose health risks but also accelerate pipeline corrosion. To address this, natural gas is treated in amine plants to remove these acid gases. An amine plant employs chemical absorption techniques for natural gas treatment. It consists primarily of:

- Amine absorber column (contactor)
- Amine regenerator
- Amine continuous reclamation unit
- A triethylene glycol unit

The CO_2 would be separated from the Elk Hills gas stream using the technology of amine absorption. In the process, CO_2 is passed into an "absorber" unit, where ionized CO_2 molecules dissolve into the amine solution. The CO_2-laden amine solution then passes into a "regenerator" that strips the CO_2 from the solution and recycles the amine for reuse in the absorber (Figure 3-4).

Figure 3-4: Process Flow for Amine Absorption of CO_2 from Elk Hills Oilfield Gas



To implement this process at Elk Hills, the applicant proposes to utilize two existing on-site amine units, one for each site of the CO_2 injection network at Section 26R. The Phase 1 amine unit is already located in 26R.The second amine unit, for Phase 2, is located in Section 14Z and would be relocated to 26R to be in close proximity to the first unit at 26R.

Each amine unit would consist of:

- Amine contactor system (existing equipment for both sites)
- Amine regeneration system (existing equipment for both sites)
- Steam reboiler system (new equipment for both sites)
- Triethylene glycol unit (existing at 14Z [relocating] and new for the 26R site)
- Gas Compressor (existing at 26R and new for the second site)
- Continuous amine reclamation/regeneration systems (new equipment for both site)
- Additional equipment may be added over time as necessary, which may include additional heating, cooling, or compression, etc.

In Section 26R, the dehydration, compression and hot oil system for the amine unit are built into the CGP-1 facility. In addition to continuous amine reclamation/regeneration systems, additional equipment may be added over time as necessary, which may include additional heating, cooling, or compression, etc.

Approximately 44.7 million standard cubic feet per day (MMscfd) of Elk Hills gas passes through the 14Z site, and this gas contains approximately 5.1 MMscfd of CO_2. Treating this gas in the 14Z amine unit captures 5.1 MMscfd of CO_2 without having to relocate the amine unit. The gas would then be transported via 26R and combined with the balance of the Elk Hills gas downstream of the 26R amine unit. Blending the gas into the CGP-1 feed downstream of the 26R amine unit would allow the 26R unit to maximize CO_2 capture from the balance of the Elk Hills gas.

At each amine unit, the process utilizes approximately 8,700 gallons of produced water per day, treated with reverse osmosis to meet required specifications needed for the process. The process yields approximately 6,500 gallons of wastewater per day, which would be comingled with the Elk Hills–produced water for disposal into one or more of the existing Class II water disposal wells within the field.

The two amine units have a combined processing capability of approximately 10.6 MMscfd of CO_2 from combined natural gas throughput of 168.1 MMscfd. It is anticipated that this project would capture and inject approximately 101,743 tpy in Phase 1 and 101,743 tpy in Phase 2 of concentrated CO_2 (more than 95 percent).

The applicant would assemble all equipment off site and transport it to the proposed location for installation. The scope of on-site construction would include relocation of existing equipment (14Z components), installation of new equipment (highlighted above), welding of piping and installation of necessary control equipment (valves, instrumentation, etc.).

These sites would be developed in two phases, and both would be located within fenced areas measuring approximately 110 by 220 feet, an area of 0.55 acres. Phase 1 would amend the existing CO_2 "area" of CGP-1, and Phase 2 would be located at one of three proposed sites located in close proximity to CGP-1.

CO_2 Compression and Pumping Facilities

A compression facility would be required as part of each capture facility. The proposed compression facility would pressurize the CO_2 from a relatively low pressure up to roughly 1,700 to 2,100 pounds per square inch gauge for dense phase transport. The compressor station would be similar to natural gas compressor stations, including compressors, dehydration units, and heat exchangers.

The CO_2 compression and pumping facility site would be located within a fenced area measuring 460 by 300 feet, an area of 3.17 acres. The facility would be accessed via existing surfaced roads northward from Skyline Road within Elk Hills, west of Gate 4. Currently, the proposed facility site is accessed via dirt roads from the ends of surfaced roads. The facility would include the following components: CO_2 compressor packages, CO_2 compressor auxiliary equipment, CO_2 pumps, chiller system, heat exchanger, electrical substation area, electrical equipment area, control room, parking area, lighting, signage, and access road(s).

CO_2 Compressor Packages

Two new CO_2 compressor packages are proposed for installation at the facility. Compressors would be of the reciprocating type and driven by electric motors. Compressor packages would be completely fabricated, and skid mounted by the compressor package vendor. Free-standing process gas coolers would also be furnished along with the compressors. The compressor packages would include inlet, interstage, and discharge process gas scrubbers. All interconnecting piping would be prefabricated by the compressor package vendor for assembly in the field. Compressor packages would also be provided with complete instrument and control systems by the package vendor.

CO_2 Compressor Auxiliary Area

An area for the location of compressor auxiliary equipment is provided adjacent to the compressor in the compressor area. Located in this area are the compressor piping, tanks, vessels, pumps, and other auxiliary equipment required to support the safe operation of the compressors.

CO_2 Pumps

Three, new CO_2 pumping units are proposed for installation at the facility. Pumps would be provided in a skid mounted configuration and would be driven by electric motors.

Chiller System and Heat Exchanger

A chiller system and heat exchanger are included in the facility design to cool the CO_2 during periods of high ambient temperature. The chiller system would be a skidded unit and electrically powered.

Lighting

The proposed facility lighting would allow for maintenance and security activities during project operation. Low-level lighting would be installed at the entry gates, substation, equipment areas and Control Room. Proposed lighting outside of the substation would be downward facing, shielded, or otherwise modified to prevent emission of light or glare beyond the property line or upward into the sky as required by Kern County Ordinance (Chapter 19.81) - Outdoor Lighting-Dark Skies requirements.

Signage

Signage would be installed on the fence in the vicinity of the main entry gates on the project site. The signage would identify the project owner, operator, and emergency contacts and provide safety and security information. Additionally, small-scale signage would be posted at the main entry gates and intermittently along the fencing around the project site to indicate "No Trespassing" and "Private Property" for security and safety purposes. All signage would conform to Kern County signage requirements. Specific signage about the CCS activities would be required.

Water Use

Each site of the process utilizes approximately 8,700 gallons of clean produced water per day, treated with reverse osmosis to meet required specifications needed in the process. Each site of the process yields approximately 6,500 gallons of wastewater per day. The wastewater stream would be transferred from the site location to the existing 27R wastewater facility which handles approximately 4.32 million gallons per minute of wastewater either through intermittent shipments via trucks or continuously through a pipeline where the Elk Hills-produced water is processed for disposal into the existing Class II water disposal wells within the field. Upon operation of both sites, the system would have a combined processing capability of about 10.6 MMscfd of CO_2, based on a rated natural gas throughput of 168.1 MMscfd.

3.4.2 Transport of CO_2

Facility Pipeline

In Phase 1, after compression, the CO_2 would be transferred through an up to 16-inch underground facility pipeline to the four injection wells within Section 26R. After installation of the up to 16-inch underground facility pipeline to the remaining two wells at A1A2 during Phase 2, the CO_2 would be transferred to the remaining two wells in A1A2. The injection pipeline and the facility pipelines would be newly designed and constructed underground to facilitate the transport of the CO_2 gas to the injection wells.

Approximately 4.82 miles of up to 16-inch facility pipeline would be installed underground for Phase 1, while approximately 6.38 miles of up to 16-inch facility pipeline would be installed for Phase 2. The majority of facility pipeline would be collocated with existing pipelines along established rights-of way. In sections that would not be collocated, new existing sleepers would be installed prior to pipe placement. New sleeper locations would require boreholes approximately

8 inches in diameter. Drainages intersecting the pipeline route would be spanned. All facility pipelines would be covered in cathodic protection to prevent corrosion. After installation, the pipeline would be hydrotested to verify its integrity.

Pipeline Appurtenances

Pipeline appurtenances include valves, launchers, receivers, metering devices, and manifolds. The new pipeline system would be piggable, with launchers and receivers at all ends.

Valves

New valves would be installed based on regulatory and owner requirements.

Launchers and Receivers

Pipeline tools (often referred to as "pigs") are used for maintenance and inspection purposes during pipeline operation. In-line inspection tools (often referred to "ILI" or "smart pigs") are used to assess pipeline integrity. The pigs originate from a launcher and terminate at a receiver.

Metering Skids

Skid-mounted metering devices are used to measure the flow rate and volume of fluid transported through the pipeline and for pipeline leak detection.

Manifolds

Valve manifolds are used to direct flow to multiple locations.

Pump Stations

Depending on the pipeline distance, volume of CO_2 carried, and pipeline size, an intermediate compression or pump station may be required. These intermediate stations are accessory to the injection facilities and would be substantially the same as the initial compression station. If the CO_2 is transported in dense phase, a pumping station would be used in lieu of a compression station. The pump station would include pumps, heat exchangers, chillers, and associated electrical and controls systems.

3.4.3 Carbon Dioxide Storage Sites

CO_2 captured at the sources described above would be sent for disposal into six Class VI UIC wells in compliance with the EPA UIC program Class VI geologic storage regulations. The six wells would be implemented in two phases:

Phase 1: 26R (one converted, three new)

- Injection well - 26R (373-35R)
- Injection well - 26R (353X-35R)

- Injection well - 26R (345-36R)
- Injection well - 26R (363-27R)

Phase 2: A1A2 (conversion of two Class II wells used for oil recovery)

- Injection well - A1A2 (355-7R)
- Injection well - A1A2 (357-7R)

Locations of the proposed Class VI injection wells, as well as facility pipeline and CO_2 processing facilities, are shown in Figures 3-5 and 3-6 below.

Figure 3-5: Location of the Phase 1 Wells: 373-35R, 353X-35R, 345-36R, and 363-27R

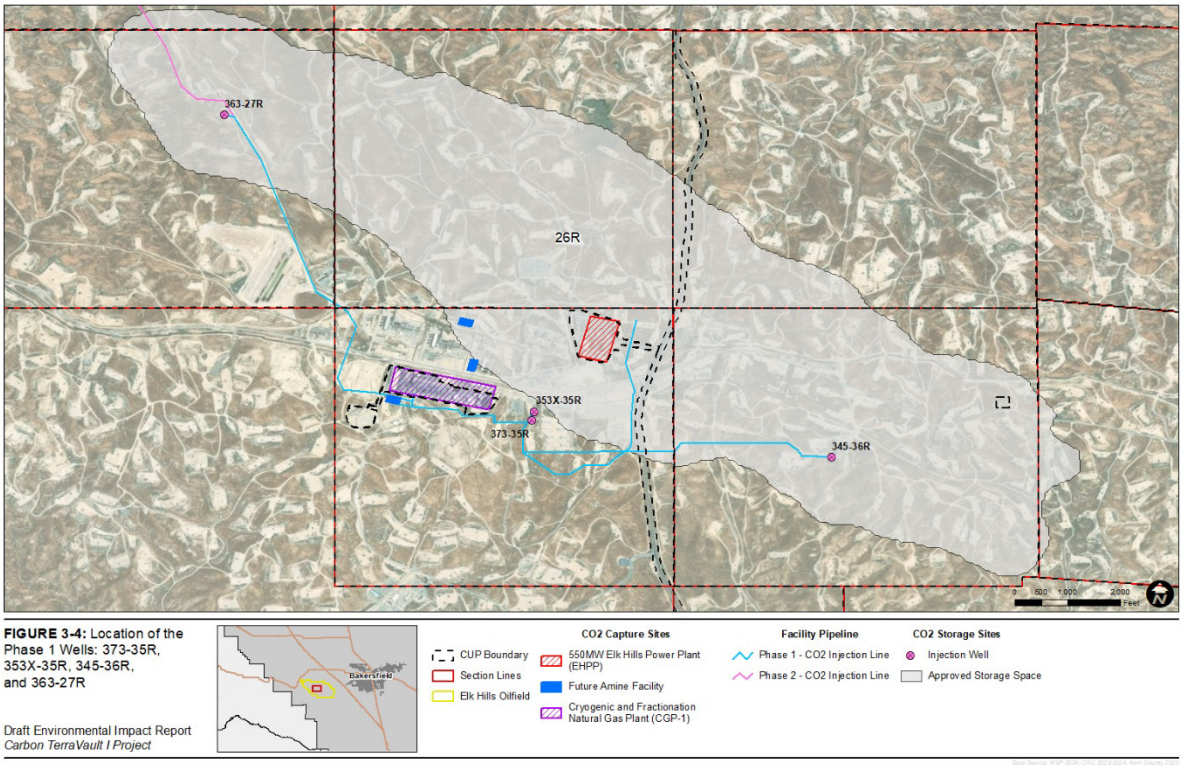
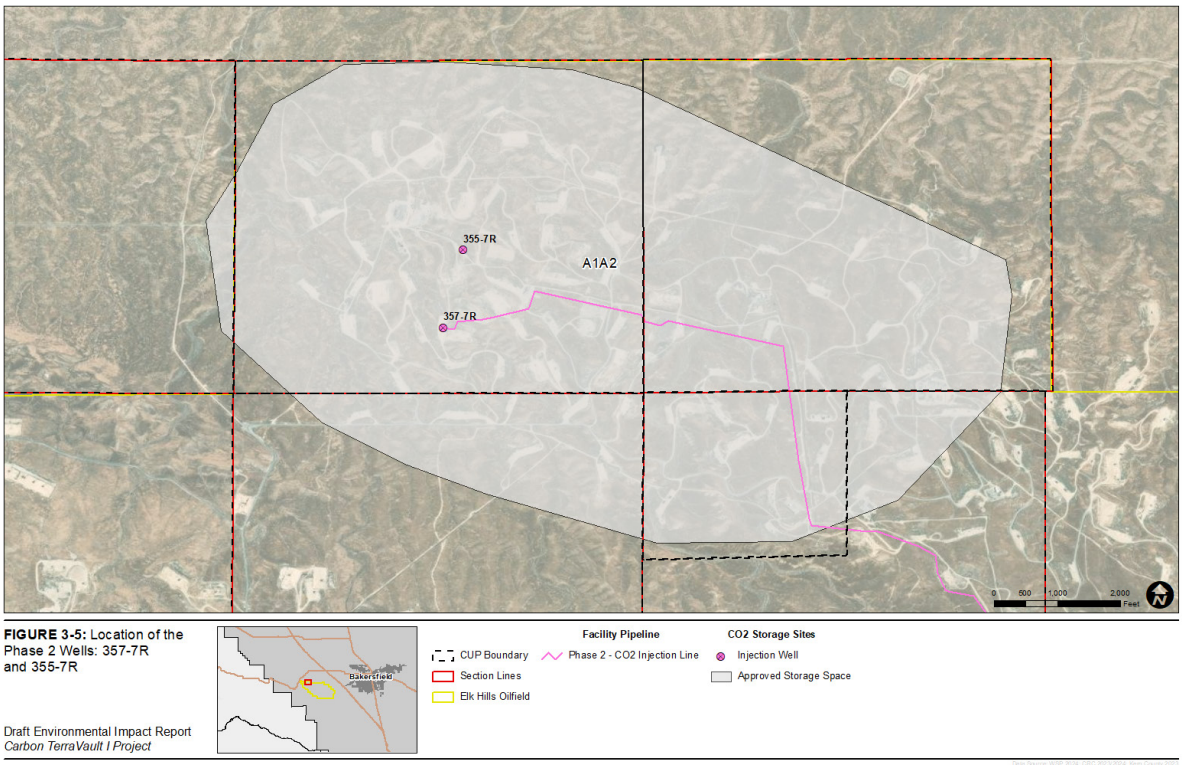


Figure 3-6: Location of the Phase 2 Wells: 357-7R and 355-7R



Once the CO_2 arrives at the storage field, it would be routed to an injection facility. The injection facility would be a compression or pumping station that boosts the pressure up to an even higher pressure so it can be injected down an injection well. These injection facilities would be similar to the compression and pumping stations already mentioned.

The concentrated CO_2 would then be injected into one or both of the geographically confined reservoirs (26R and A1A2) for storage in perpetuity. These areas have been identified as a location suitable for such storage and a potential to provide a contribution to the goals of California for carbon neutrality by 2045 by reducing industrial uses to no net contribution and potentially supporting direct removal of CO_2 from the air. California Executive Order B-55-18 mandates that the state achieve carbon neutrality by 2045 and maintain net negative emissions thereafter.

Geologic Formations/Storage Reservoirs

In support of the EPA Class VI UIC application, CTV I has fully characterized the site for suitability by integrating static data that includes well logs, three dimensional seismic and core data, as well as dynamic data that includes reservoir production, injection, and pressure data gathered over the 40-year development history. Both datasets support the geological framework establishing sand continuity and as well as vertical confinement by the Reef Ridge Shale and lateral reservoir confinement. Additional background on the Monterey Formation is described in greater detail in Section 4.7, *Geology and Soils*.

EPA Regulatory Oversight

The EPA is the primary regulatory authority for Class VI injection permits, under Section 1421 of the Safe Drinking Water Act, to protect USDW. In addition, the EPA maintains primary enforcement authority, often called primacy, to implement the UIC program responsibilities. In California, Region 9 of the EPA maintains authority and primacy over Class VI wells. Class VI wells require a permit to construct and operate, are used solely for the purpose of injection of CO_2 into underground subsurface rock formations, and are most rigorous of all well classes within the UIC program. After a Class VI permit application is submitted, the EPA performs a thorough review of every component of the detailed permit application with a 30-day public comment period. The UIC program works with injection well operators throughout the life of the well to confirm that operations do not contaminate drinking water. This is accomplished through inspections and verifiable compliance that the wells are properly constructed, have no leaks, and are being monitored and operations are recorded by operators. This is all to ensure that USDW are free from endangerment, defined in the federal code of regulations (CFR 144.12), which prohibits movement of fluid into USDW:

> *(a) No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons.*

Through the UIC program, the EPA is responsible for the regulation of project siting, well construction, injection operations, testing and monitoring, emergency response, financial responsibility, and eventual plugging and closure of the wells and injection sites. All regulations for Class VI wells fall under the EPA UIC program, as described above, and further described in Appendix K-3 of this EIR.

26R Monterey Formation Reservoir

The Monterey Formation 26R storage reservoir was discovered in the 1940s and has been developed with primary drilling and improved recovery with water and gas injection. The Miocene aged Monterey Formation 26R reservoir at the 31S anticline is approximately 6,000 feet below the ground surface and produces from turbidite sands. The 26R Monterey Formation storage reservoir has minimal connection outside the Approved Storage Space creating a reservoir with no connection to regional saline aquifers. Within the Approved Storage Space, there is no evidence of faults that transect the Monterey Formation or penetrate the Reef Ridge confining layer.

Confinement of CO_2 injected into the 26R storage reservoir is supported by the following:

- The Monterey Formation 26R reservoir hydrocarbons were confined for several million years.
- The Reef Ridge Shale primary confining layer is 800 to 1,000 feet thick over the storage reservoir and has <0.01millidarcy (mD) permeability. Confinement of the Reef Ridge Shale has been demonstrated by the injection of 841 billion cubic feet of gas and 114 million barrels of water with no leakage.
- CO_2 plume modeling results show confinement of the injected CO_2 plume by up-dip pinch-out of the reservoir on the anticline structure and lateral confinement by reservoir edges. CTV I would maintain the reservoir pressure at or beneath the discovery pressure of the reservoir, ensuring that CO_2 does not migrate beyond the edges of the anticline structure or into the Reef Ridge Shale.

Storage capacity for the Monterey Formation 26R storage reservoir based on computational modeling results is up to 38 million tons of CO_2. This is sufficient capacity for the total proposed injectate volume.

A1A2 Monterey Formation Reservoir

The A1A2 storage reservoir was discovered in the 1970s and has been developed with primary drilling and improved recovery with water and gas injection. The Monterey Formation A1-A2 storage zone is approximately 8,500 feet deep and produces from turbidite sands. The Monterey Formation A1A2 storage reservoir has minimal connection outside the AoR, creating a reservoir with no connection to regional saline aquifers. Within the AoR there is no evidence of faults that transect the Monterey Formation or penetrate the Reef Ridge confining layer.

Confinement of CO_2 injected into the storage reservoir is supported by the following:

- Prior to discovery of the Monterey Formation A1A2 reservoir, a gas cap with underlying oil was confined for several million years.
- The Reef Ridge Shale primary confining layer is 1,500 feet thick over the storage reservoir and has <0.01 mD permeability. Confinement of the Reef Ridge Shale has been demonstrated by the injection of 175 billion cubic feet of gas and five million barrels of water with no leakage.
- Plume modeling results show the lateral confinement of the injected CO_2 plume by the anticline structure. CTV I plans to maintain the reservoir pressure at or beneath the discovery pressure of the reservoir, ensuring that CO_2 does migrate beyond the edges of the anticline structure or into the Reef Ridge shale. The up-dip CO_2 plume is confined by shale and the non-deposition of reservoir sands.

Storage capacity for the Monterey Formation A1A2 storage reservoir based on computational modeling results is approximately 8 to 10 million tons of CO_2.

Injection Wells

The project would construct six injection wells—four (one converted, three new) proposed within Phase 1 (26R) and two (converted Class II wells used for oil recovery) within Phase 2 (A1A2). These injection facilities would require compression and/or pumping stations that would boost the pressure of the CO_2 up to the required injection pressure so it can be safely injected down an injection well. The injection facilities could include compressors, pumps, heat exchangers, chillers or coolers, tanks, water treatment, meters, electrical and controls equipment among others. The height of each wellhead is approximately 12 feet, and the wellhead, cellar, incoming lines, and other equipment located around the wellhead would have a footprint of approximately 20' x 20'.

26R Monterey Formation Reservoir

The Monterey Formation 26R reservoir would be developed with four injector wells during Phase 1 (373-35R, 353X-35R, 345-36R, and 363-27R) (see Figure 3-5). Three new injection wells would be drilled prior to the initiation of injection and repurposing of the existing injector 373-35R well (currently approved by California Geologic Energy Management Division (CalGEM) for Class II injection of water for the purpose of reservoir pressure maintenance).

373-35R Well Operation

Injectors would be operated to inject the desired rate of super-critical phase CO_2. For attaining super-critical flow, surface injection pressure would be a minimum of 1,200 pound per square inch (PSI). As the depleted oil reservoir fills up, a higher surface injection pressure would likely be required. Final reservoir pressure target is 3,250 PSI. It is assumed that at shut-in, the downhole injection pressure would be 4,010 PSI (0.59 PSI per foot) for well 373-35R.

As the reservoir fills up with CO_2 it would pressure up, thus creating a continually changing reservoir and injector condition over injection life. A downhole injection pressure of 4,010 PSI is assumed to occur at shut-in timing when reservoir pressure has reached its final level at 3,250 PSI. This translates to a surface injection pressure of approximately 1,600 PSI, which would be achieved via a surface booster pump. Over 40 years of gas and water injection experience into the Monterey Formation supports that these operating limits are appropriate and effective. Additionally, the final reservoir pressure target of 3,250 PSI is significantly below the Reef Ridge confining shale estimated minimum geomechanical tensile failure pressure of approximately 7,500 PSI.

A1A2 Monterey Formation Reservoir

The Monterey Formation A1A2 reservoir would be developed with two injectors during Phase 2 (357-7R and 355-7R) (see Figure 3-6).

357-7R and 355-7R Well Operations

Two injection wells would inject CO_2 into the Miocene aged Monterey Formation A1A2 at the Northwest Stevens anticline approximately 8,500 feet below the ground surface. Injectors would be operated to inject the desired rate of CO_2 over the life of the project. The project would utilize existing injectors, 357-7R and 355-7R, for the Elk Hills A1A2 Storage project. The wells are in

Section 7R within the unit boundary of Elk Hills. 357-7R and 355-7R surface elevations are 792 feet and 714 feet above mean sea level, respectively. These injectors are currently approved by CalGEM for Class II injection of up to 50 million cubic feet per day gas (up to 44 percent CO_2) for the purpose of reservoir pressure maintenance. The wells have been engineered for the injection of CO_2 with appropriate materials able to minimize corrosion and to ensure that the wellbore stresses are within specifications and standards given the planned operating conditions.

357-7R: At the start of injection, as the A1A2 reservoir is depleted in pressure, a surface and bottom hole injection pressure of 670 PSI and 695 PSI, respectively, are only required to inject. As the pressure in the reservoir builds up, higher surface and bottom hole pressures would be required. At the end of injection, the estimated surface and bottom hole pressures required are 1,140 PSI and 3,909 PSI, respectively, which is the maximum pressure CTV I expects to operate the well at. At this time, CTV I expects a maximum injection rate of 15 million cubic feet per day for which the maximum expected bottom hole injection pressure is 3,909 PSI. A threshold of 10 percent over these would be used to configure the automation and alarms, which equates to 16.5 million cubic feet per day and 4,300 PSI. If either threshold is achieved or exceeded, the system would deliver alarms to indicate there is an issue.

355-7R: At the start of injection, as the A1A2 reservoir is depleted in pressure, a surface and bottom hole injection pressure of 695 PSI and 762 PSI, respectively, are only required to inject. As the pressure in the reservoir builds up, higher surface and bottom hole pressures would be required. At the end of injection, the estimated surface and bottom hole pressures required are 1,175 PSI and 3,923 PSI respectively, which is the maximum pressure CTV I expects to operate the well at. At this time CTV I expects a maximum injection rate of 15 million cubic feet per day for which the maximum expected bottom hole injection pressure is 3,923 PSI. A threshold of 10 percent over these would be used to configure the automation and alarms, which equates to 16.5 million cubic feet per day and 4,315 PSI. If either threshold is achieved or exceeded, the system would deliver alarms to indicate there is an issue.

Monitoring Wells

There are 10 existing oil wells, no longer in operation, that the proposed project would convert to monitoring wells co-located next to the six injection wells. Monitoring activities would extend beyond the injection phase of the project pursuant to 40 CFR 146.93 until site closure is granted. Monitoring requirements during post-injection are similar to those during injection, with activities such as sampling occurring quarterly and monitoring well integrity testing at frequency per EPA requirement. The project requires three monitoring wells for the Elk Hills A1A2 Approved Storage Space and three monitoring wells for the 26R Approved Storage Space. The EPA UIC permit shows the applicant intends to repurpose two existing wells for monitoring of both the injection interval and one above zone monitoring. Additionally, six existing oil wells in the project area, no longer in operation, would be converted to seismic monitoring wells, as required by the California Integrated Seismic Network.

3.5 Construction

3.5.1 Construction Phasing and Equipment

Durations and Workforce

The project would be constructed by several specialized construction contractors. Project construction would take 18 to 24 months for construction, commissioning, and start-up to cover the different phases of the project. The various elements of the project would be constructed concurrently on the project site with the following durations:

- Facility Pipelines (6 to 12 months)
- Capture Facilities (18 to 24 months)
- New Injection and Monitoring Wells (four to six weeks per well): New well construction of injection and deep (non-USDW) monitoring wells would take approximately six weeks per new well and includes well pad dirt work to prepare for the drilling rig, the drilling operation, and the completion operation. New USDW wells would take about four weeks per well.
- Workover Wells (two weeks per well): Workover/conversion of existing wells for injection and monitoring would take about two weeks per well.

Well conversion and drilling activities are likely to begin 8 to 18 months prior to planned first injection.

Construction by Project Component

Some construction activities may continue 24 hours per day, seven days per week. Construction materials and supplies would be delivered to the project site by truck. When possible, equipment and materials would be stored in proximity to the area where work would be undertaken. Truck deliveries would normally occur during daylight hours. However, there would be offloading and/or transporting to the project site on weekends and during evening hours.

Capture Facilities

All equipment would be assembled off site and transported to the proposed location for installation. The scope of construction would include relocation of existing equipment (14Z components), installation of new equipment (as outlined above), welding of piping and installation of necessary control equipment (valves, instrumentation, etc.).

Facility Pipeline Construction Phase

Facility pipeline construction is likely to occur on multiple sections of the pipeline at once. Other work related to the facilities may also overlap with the pipeline construction work. The pipeline project construction would involve a combination of conventional trenching and boring.

Conventional trenching involves installing pipe within an open trench followed by backfilling. The pipeline would be installed using conventional trenching and surface placement on existing pipe racks. New pipe would be installed underground using primarily traditional cut and cover (trenching) techniques with short bores used for road crossings if necessary. It is anticipated that approximately 11.2 miles of up to 16-inch pipeline would be constructed as a result of this project. The project includes appurtenances for inspecting and maintaining the pipeline, isolation valves, electrical power, instrumentation, communication, and reservoir monitoring. Idling and purging would occur after the new pipeline for each phase of construction is operational.

The project also includes establishing a temporary construction corridor along the pipeline alignment, temporary storage and laydown areas, and hydrostatic testing, resulting in temporary disturbance associated with the pipeline construction corridor and temporary construction storage and laydown areas, and limited permanent disturbance associated with construction of the pipeline. The temporary construction corridor width may be up to 50 feet, but in some instances, the corridor width may be reduced to avoid potential impacts to sensitive natural resources or infrastructure. Construction corridor widths allow for a sloped or benched trench at the grade surface, reservation of spoils for backfill, off-road construction equipment, and a travel path.

Pipeline construction duration may vary based on factors such as weather, seasonal environmental constraints, resource availability, number of contractor spreads, permit acquisition, and other issues encountered in the field. Pipeline installation rates are dependent on terrain and other site-specific conditions, and number of welds required in the trench. An estimated rate of installation of approximately 400 feet of pipe per day is expected.

Trenching and Construction

Most of the pipeline would be constructed using traditional cut and cover trenching techniques. Trenching requires the use of an excavator or backhoe. Within the temporary construction corridor, the trench would be completed using an excavator, backhoe, or trencher. Where there is sufficient construction right-of-way (ROW), the excavated material would be sidecast and stockpiled adjacent to the trench within the temporary construction corridor. As appropriate in rural/agricultural areas, topsoil would be removed, stockpiled, and returned. In rural or undeveloped areas, vegetation clearing would occur before trench excavation. Where tree removal is required, stumps would be removed during grading and pipeline installation.

Where required for trench safety and stabilization, a shoring box would be installed in the trench, or the trench may be benched where required by location, soil type, depth, or site-specific safety requirements. If needed, sand would be placed in the bottom of the trench as bedding for the new pipe.

Pipe sections would be assembled above grade and welded, and girth welds would be coated prior to being lowered into the trench. Individual sections of the pipe would be bent to conform to the contours of the trench and terrain, where necessary. Non-destructive inspections would then be conducted at each individual weld before they are coated. Once the pipe is welded to the approved Company specifications, all welds would be radiographically tested in accordance with American Petroleum Institute (API) 1104 standards.

An exterior coating would be factory-applied to all pipe section joints in advance of arriving on site.

Prior to the pipe being lowered into the trench, the trench would be inspected for proper depth, and rocks or other obstructions would be removed. Sideboom tractors situated within the temporary construction corridor would lower each pipeline segment into the trench.

After the pipe is lowered into the trench, loaders and backhoes would be used to replace the spoil on top of the pipe and compact the soil. The trench would then be contoured and, where applicable, the area would be revegetated. All areas disturbed during construction would be returned to pre-construction conditions following backfill and compaction. Debris and excess soil resulting from trench excavation would be hauled to an approved disposal site.

In paved areas, the pipe would be lowered, and the trench would be backfilled either with native soil or slurry, and the trench would be repaved upon completion of backfilling and compaction.

Water Usage

The proposed Project construction would require the use of water for dust suppression, fire protection, and pipeline hydrotesting. The project may require up to 250,000 gallons per day depending on weather and site conditions. The source of this water would be groundwater from the Elk Hills water system that is sourced from West Kern Water District.

Traffic

Traffic generated during the pipeline construction phase would include personnel vehicles and water trucks. These vehicles would access the pipeline along the route under construction at the time. Trip generation estimates for pipeline construction traffic is presented in Table 3-5.

Trip generation calculations were based on the following peak construction period assumptions:

- 1-ton Work Trucks: It is anticipated there would be approximately 16 1-ton work trucks, which would make a trip to the work site and one trip out of the work site daily. It is assumed that 75 percent of the 1-ton work trucks would arrive and depart the work site within the peak hour of adjacent street traffic.
- 5-Ton Work Trucks: It is anticipated there would be approximately six 5-ton work trucks, which would make a trip to the work site and one trip out of the work site daily. Five-ton work trucks would be on site periodically as needed. It is assumed that 75 percent of the 1-ton work trucks would arrive and depart the work site within the peak hour of adjacent street traffic.
- Water Trucks: It is anticipated there would be approximately four water trucks that would make a trip into the work site and one trip out of the work site periodically as needed. It is assumed that one of the water trucks would arrive and depart the work site within the peak hour of adjacent street traffic.

Table 3-5 below summarizes the trips generated by the project using the above assumptions.

As shown in Table 3-5, the construction of the pipeline would generate approximately 52 daily trips, with 19 trips during the PM peak hour and 19 trips during the AM peak hour of a typical weekday.

Traffic control would be provided for street encroachments and crossings. The Traffic Control Plan would identify temporary road closure locations, lane closures, and traffic detours that may be necessary to work safely within or near roadways and urban areas.

Table 3-5: Facility Pipeline Construction Phase Trip Generation

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peak Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
1 Ton Work Truck	16 (per day)	32	100% 13	0% 0	0% 0	100% 13
5 Ton Utility Flat Bed Truck	6 (per day)	12	100% 5	0% 0	0% 0	100% 5
Water Truck	4 (per day)	8	100% 1	0% 0	0% 0	100% 1
Total Trips		52	19	0	0	19

Key:
ADT = average daily traffic

Hydrostatic Testing

After the pipeline is installed and backfilling is complete, the pipeline would be hydrotested to verify its integrity. During this process, new pipe segments would be filled with water acquired in accordance with applicable permits. Water in the pipeline would be allowed to settle for at least 12 hours before the internal pressure level is raised and held at a specified pressure for a set time in accordance with U.S. Department of Transportation (USDOT) specifications. Each segment would be tested for a minimum of 8 hours. Test water would be recovered and reused to test other segments. Once all of the testing is complete, the test water would be chemically analyzed to evaluate if it is clean and suitable for secondary uses such as dust control along the pipeline ROW or at the SMR, watering for revegetation, or for proper discharge in accordance with permit conditions.

CO_2 Compression and Pumping Facility Construction Phase

The two CO_2 compression and pumping facilities would be constructed in two consecutive phases over 18 to 24 months. Phase 1 would be located within the CGP-1 facility, and Phase 2 would be located within a fenced area measuring approximately 120 by 210 feet, an area of 0.55 acres. The facilities would be accessed via Skyline Drive within Elk Hills, west of Gate 4.

During construction, produced groundwater from the Elk Hills water system would be used for dust suppression, fire protection, and pipeline hydrotesting. Construction activities would generally

occur during daylight hours, but limited night work could potentially include, but are not limited to, pipeline tie-in connections, refueling equipment, staging equipment and material for the following day's construction activities, quality assurance/control, and commissioning. All lighting utilized during night work would be situated to avoid lighting impacts on the surrounding area by directing lights down to the work area and only for durations necessary to complete the task safely. Traffic control would be provided for street encroachments and crossings, as necessary.

Project construction would result in temporary disturbance associated with the pipeline construction corridor and temporary construction storage and laydown areas and limited permanent disturbance associated with new pipeline sleeper installation sites and the CO_2 compression and pumping facility.

The project construction schedule is expected to take 18 to 24 months. Well activities, infrastructure work and facilities work may be conducted simultaneously as these activities are mostly geographically separated from each other. Construction duration may vary based on factors such as weather, seasonal environmental constraints, resource availability, or various site-specific conditions.

Pre-construction conditions would dictate appropriate work locations and post-construction restoration activities along the construction corridor. Restoration methods may include replacing paved surfaces and landscaping in urban areas, or loosening surface soils and reseeding or hydroseeding with a mix of native grass and forb seed in undeveloped natural areas (e.g., grazing lands). Where appropriate in rural portions of the proposed pipeline corridor, grasses and shrubs would be permitted to naturally recolonize the disturbed areas to match surrounding conditions and would be consistent with landowner specifications, as appropriate. Best management practices would be followed to prevent soil erosion and off-site sediment transport until vegetation is re-established.

Traffic

The CO_2 compression and pumping facility construction phases would generally include personnel vehicles. Anticipated deliveries of materials and equipment would occur during off peak periods and sporadically. Deliveries were not included in the trip generation as they would generally be very low volumes and not a daily occurrence. These vehicles would access the pipeline along the route under construction at the time. Trip generation estimates for pipeline construction traffic is presented in Table 3-6.

Table 3-6: CO_2 Compression and Pumping Facility Construction Phase Trip Generation

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peak Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
Worker Vehicle	80 (per day)	160	100% 48	0% 0	0% 0	100% 48

Key:
ADT = average daily traffic
CO_2 = carbon dioxide

Trip generation calculations were based on the following peak construction period assumptions.

There would be approximately 80 construction personnel that would be on site daily. The following assumptions were made regarding carpool and peak hour travel:

- A carpool factor of 1.25 was used, as a conservative assumption of personnel per vehicle.
- It is assumed that 75 percent of the personnel vehicles would arrive and depart the work site within the peak hour of adjacent street traffic.

As shown in Table 3-6, the construction of the CO_2 compression and pumping facility would generate approximately 48 daily trips, with 48 trips during the PM peak hour and 48 trips during the AM peak hour of a typical weekday.

At peak construction, a maximum of 80 construction workers would be required for the project at one time. Construction employees are expected to travel from population centers such as Tehachapi and Rosamond, California and report to the designated construction staging yards prior to the beginning of each workday. It is anticipated that the employees would utilize Skyline Drive and Elk Hills Road as points of ingress/egress to the project site and that, once on site, they would access various sections via the existing and improved network of dirt roads. Traffic control would be provided for street encroachments and crossings as necessary.

Conversion of Existing Wells to Injector or Monitoring Wells

The process to convert an oil and gas producing well to a Class VI injector is similar in scope to conversion to Class II, albeit regulatory requirements may be slightly different. In Class II conversion, a permit to re-work (from CalGEM) is required due to the well type change and may also be triggered if the well configuration is being changed (i.e., plugback depth, perforations).

Converting an existing well to injection and monitoring typically requires permitting (from CalGEM) due to the change in well type and downhole activity conducted by a workover rig. The rig is manned by a crew of three to four specially trained workers. All production equipment is removed from the well, and the well is serviced and configured with injection equipment. Downhole and surface injection equipment is tested to ensure integrity, and surface equipment is configured with sensors and automated electronic alarms to detect and report anomalies during injection. Once all conditions of the permit and regulations are achieved, communication is established between the well and the central control facility, and injection begins. Depending on the scope of services required, an additional two to five workers may be on location any given day during the operations. The duration of the activity is typically three days when operating during daylight hours only and may reasonably require two to five trucks per day.

Equipment used for converting existing wells to injectors is consistent with the scope and equipment used for well workover activities. Well workover construction activities are implemented on existing well pads. A workover operation generally consists of a rig, support trucks, portable tanks, pumps, and various other equipment (depending on the complexity of the

planned work). Most of the portable engines used in these operations are regulated by the California Air Resources Board's (CARB's) portable engine program.

Well Re-Working and Workovers

During all phases of the project (pre-injection, injection operations, and post-injection), construction activities may include well re-working and workovers. Well re-working and workover construction activities are implemented on existing well pads. A re-work or workover operation generally consists of a rig, support trucks, portable tanks, pumps, and various other equipment (depending on the complexity of the planned work). Most of the portable engines used in these operations are regulated by the CARB's portable engine program. Well re-work typically lasts for a period of a few days (daytime only); however, some large-scale jobs can take a week or more.

Well re-working requires written notification to the EPA Director 30 days prior to well changes, such as changing or repairing the well casing, re-perforating, plugging of perforations, liner replacement, and redrilling including deepening and side-tracking. Well workovers are more routine well maintenance activities, including downhole equipment repair or replacement, and well clean-out (the removal of sand, sediment, or debris build-up or equipment). Additionally, subsurface monitoring activities required as a condition of the permit, such as wireline surveys, may require similar notification and would be similar or less in scope and environmental impact as workovers, as defined above. To reduce habitat disturbances, existing well pads are used, or sometimes extended, to perform remedial well work. Extensions are only performed if it is necessary to provide a safe well-workover environment.

Access

The project also includes establishing and utilizing a temporary construction corridor and temporary storage and laydown areas. The temporary construction corridor ROW, of up to approximately 12 feet in width, would be established along areas of the pipeline route not accessible via established roads or other existing cleared areas to allow for off-road construction equipment and a travel path. Temporary storage and laydown areas outside of the ROW would be used to store equipment, pipe, and materials, and to stage construction activities. Laydown areas are designed to minimize new disturbance by utilizing existing, cleared areas such as fields, parking lots, or other developed areas. After completion of construction, all laydown areas would be returned to pre-project contours and revegetated to native habitat conditions.

Construction of the project would include improvements to existing access roads to the project site, the dirt access roads to the proposed turbine locations, and construction of turbine and crane pads. Other construction-related tasks would include the creation of temporary roadways and equipment laydown sites that are not required as part of the ongoing operating of the facility would be reclaimed. Such roads and laydown areas would be restored to their previous condition through hydroseeding.

Materials and Equipment

During construction produced groundwater from the Elk Hills water system would be used for dust suppression, fire protection, and pipeline hydrotesting.

Staging areas may be required for material handling, temporary storage, and project staging activities. In addition, concrete batch plants would be temporarily located within the project site during the construction phase.

3.5.2 Site Preparation

The project site is somewhat flat but may require earthmoving equipment to achieve an elevation for final grading. The roadway extensions are anticipated to be constructed by clearing, leveling, and surfaced with decomposed granite/gravel and/or compacted road base. Sediment and erosion controls would be installed in accordance with an approved Storm Water Pollution Prevention Plan (SWPPP) if required.

Project grading would be minimized to the extent feasible to reduce unnecessary soil disturbance and movement. Earthwork would require the use of earthmovers, scrapers, excavators, dozers, water trucks, paddlewheels, haul vehicles, and graders. On-site trenching also would be required to enable the placement of underground electrical and communication lines. Proposed grading would be balanced on site, and no import or export of soils would be required.

Applicable local, State, and federal requirements and best management practices (BMPs) would be implemented during the construction phase. Consistent with the County zoning ordinance and with guidelines provided in the California Stormwater Quality Association's Construction Best Management Practice Handbook, BMPs would be implemented, including preparation of a SWPPP and a soil erosion and sedimentation control plan to reduce the potential for erosion and to minimize effects on storm water quality. All site preparation would occur in conformance with County BMPs and San Joaquin Valley Air Pollution Control District rules for dust control.

Most construction activities would take place between 6:00 a.m. and 9:00 p.m., Monday through Friday, and between 6:00 a.m. and 9:00 p.m. on Saturdays and Sundays, as per construction schedule. While most construction activities would generally occur during daylight hours, limited nightwork could potentially include, but is not limited to, pipeline tie-in connections, refueling equipment, staging equipment and material for the following day's construction activities, quality assurance/control, and commissioning. All lighting utilized during nightwork would be directed downward to the work area and used only for durations necessary to safely complete the task. The project would be constructed in accordance with all applicable Kern County Noise Standards and hours of construction would comply with applicable requirements and proximity to sensitive receptors.

Ground Disturbance

Approximately 330,000 square feet of area would be graded at approximately 6 inches in depth within the project footprint as site preparation for installation of various project components. Grading operations would result in approximately 61.2 cubic yards of material. Approximately 1,600 square feet of fill material would most likely come from nearby "borrow" sites within the field.

Dust Control

The project would implement standard fugitive dust control measures which would be implemented to construction contracts. These dust-minimizing techniques include:

- Watering active construction sites based on the type of operation, soil, and wind exposure.
- Stabilizing dust emissions at disturbed areas, including storage piles that are not actively utilized.
- For construction purposes, using water or other approved substances.
- Prohibiting grading activities during periods of high wind (over 20 miles per hour).
- Limiting vehicle speed on site to minimizes dust emissions on unpaved driveways (15 miles per hour).
- Covering trucks hauling dirt, sand, or loose materials.
- Posting a publicly visible sign with the telephone number and person to contact regarding dust complaints. The contact would respond and take corrective actions within 48 hours. The phone number of the San Joaquin Valley Air Pollution Control District must also be visible to ensure compliance with rules regarding nuisance and fugitive dust emissions.

Excavation Depths

There would be approximately 5 feet (60' inches) of over-excavation and re-compaction within Elk Hills. Disposal of excavated soil is not anticipated as sites would be designed to be "balanced" (cut and fill are equaled to determine final site elevation). Any stockpiled soil would be kept within the general project area (within the field).

Staging Locations

The project also includes establishing and utilizing a temporary construction corridor and temporary storage and laydown areas. The temporary construction corridor ROW, of up to approximately 12 feet in width, would be established along areas of the pipeline route not accessible via established roads or other existing cleared areas to allow for off-road construction equipment and a travel path. Temporary storage and laydown areas outside of the ROW would be used to store equipment, pipe, and materials, and to stage construction activities within the project footprint. Laydown areas are designed to minimize new disturbance by utilizing existing, cleared areas such as fields, parking lots, or other developed areas. After completion of construction, all laydown areas would be returned to pre-project contours and revegetated to native habitat conditions.

Security

Security would be maintained by CRC Elk Hills Security personnel. If the project site is easily accessible from outside the boundaries of the CRC Elk Hills Petroleum Reserve, then a 6-foot-tall wire fence shall be erected, and the site attended by a security guard during non-working hours at the discretion of the project management.

Fire Suppression and Safety

Combustible vegetation on and around the proposed Facility would be actively managed by the Project owner during both the construction and operation phases to minimize fire risk. Combustible products would be either limited in height or removed primarily through a combination of dirt or gravel firebreaks, grazing, and mowing. A Vegetation Management Plan would be implemented during operations to guide the use of tools such as grazing and mowing to help manage accumulation of potential fine fuels around project infrastructure. The proposed Facility would also include fire breaks around the site boundary in the form of compacted dirt or gravel breaks and access driveways subject to Kern County standards.

Water Usage

Water would be required during the construction phase for dust suppression during such activities as clearing, grading, and soil compaction. Minimal water use is expected during the facilities construction phase, as Phase 1 is located with the existing CGP-1 facility footprint, and the three potential sites for Phase 2 are in areas that require minimal surface preparation.

Water usage during all phases of construction, primarily for dust-suppression purposes, is not anticipated to exceed 75 acre-feet over the 18-month construction phase. The produced groundwater from the Elk Hills water system would be trucked for dust suppression, soil compaction, concrete hydration and other miscellaneous activities requiring non-potable water.

Bottled water would be provided to the construction workers for consumption. Additionally, existing on-site restroom facilities for the construction workers would be supplemented by portable units to be serviced by licensed providers. No connection to a public sewer system is proposed or required for project construction or operation.

The capture facilities may require makeup water supply depending on the technology that is used. The compression or pumping stations may also require makeup water if a water-based cooling system is needed. Water to operate the CCS facilities is proposed to be sourced from a nearby water provider supplied by groundwater within the Kern County subbasin.

Hazardous Waste and Hazardous Materials Management

The proposed project would have minimal levels of materials on site that have been defined as hazardous under 40 CFR, Part 261. Materials such as the following would be used during the construction, operation, and long-term maintenance of the proposed project:

- Diesel fuel, gasoline, and motor oil – used for electrical equipment and backup generator
- Mineral oil – to be sealed within the transformers
- Various solvents/detergents – equipment cleaning

Hazardous materials and wastes would be managed, used, handled, stored, and transported in accordance with applicable local and State regulations. All hazardous wastes would be maintained in accordance with all applicable regulations. CRC has a comprehensive Hazardous Material Management Program that is updated as new chemicals are brought on to the site. This project is not expected to require any change to the chemicals used or quantities stored at Elk Hills.

Chemical storage tanks (if any) would be designed and installed to meet applicable local and state regulations. Any wastes classified as hazardous such as solvents, degreasing agents, concrete curing compounds, paints, adhesives, chemicals, or chemical containers would be stored (in an approved storage facility/shed/structure) and disposed of as required by local and state regulations. Material quantities of hazardous wastes are not proposed or anticipated to be used.

Spill Prevention and Containment

Spill prevention and containment for construction and operation of the proposed project would adhere to the EPA guidance on Spill Prevention Control and Countermeasures.

Wastewater/Septic System

As designed the project would not require additional septic systems or sewer infrastructure, as no increase in operational personnel would be required because of project implementation, and employees would utilize existing facilities. Temporary, portable restroom and portable hand washing facilities would be provided as required during construction.

3.6 Operational and Maintenance Activities

Upon completion of all construction activities, the project proponent would ensure that the facility would be properly operated and maintained. The project proponent would develop an operations and maintenance protocol to be implemented throughout the life of the project. The protocol would specify routine maintenance and operation, which typically adheres to the maintenance program developed by the project proponent. Operations and maintenance personnel would conduct maintenance activities for each item required by the routine schedule provided by the supplier or as required to keep the equipment in operation. Maintenance activities may occur seven days a week, 24 hours a day to ensure system reliability and safety. Routine maintenance would be completed annually and may include, but is not limited to, replacing checking parts for wear and

replacing as required, and recording data from data recording chips in anemometers. Operation and maintenance personnel would also inspect access roads, crane pads, and trenched areas regularly and maintain them to ensure minimal erosion.

3.6.1 Operational Traffic

Once completed, the project would include five full-time employees which would operate the facility seven days a week, 24 hours a day. An additional five full-time employees could be on site at any time if repairs or other maintenance work is required. Trip generation calculations for the operation and maintenance of the project were based on the following assumptions.

Passenger Vehicles

There would be approximately five full-time staff with an additional five employees which may be on site during maintenance or repair times on site daily. The following assumptions were made regarding peak hour travel:

- One full-time staff employee would enter and exit the facility during the peak hour of adjacent street traffic in both the a.m. and p.m. hours.
- Five maintenance/repair employees would enter and exit the site during the peak hour of adjacent street traffic in both the a.m. and p.m. hours.

Each employee would make one inbound trip, and one outbound trip daily. As shown in Table 3-7, the operation and maintenance phase of the CO_2 capture, compression, and pumping facility would generate approximately 20 daily trips, with seven trips during the PM peak hour and seven trips during the AM peak hour of a typical weekday. It is noted that the maintenance or repair work would occur periodically and there would generally only be one trip in the peak hour.

Table 3-7: CO_2 Capture, Compression and Pumping Facilities Operation and Maintenance Phase Trip Generation

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peak Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
Worker Vehicle	10 (per day)	20	86% 6	14% 1	14% 1	86% 6

Key:
ADT = average daily traffic
CO_2 = carbon dioxide

Truck Traffic

It is anticipated that diesel heavy heavy-duty trucks would make 40 trips per day following the access routes designated for travel.

3.6.2 Maintenance

The KCGP Safety Element further outlines protocol that would ensure that the project site is properly maintained. These measures include identifying access and evacuation routes at the project site, clearing dry vegetative cover, limiting potential fuel sources, and designing firebreaks (by at minimum adhering to the established setback distances). The project would implement all relevant safety measures into the operation and maintenance of the project in order to ensure the safety of employees, visitors, and residents within the vicinity of the project site.

Facility Pipeline Operation and Maintenance

Maintenance operations on the new pipeline system would follow Company's operating procedures and comply with USDOT and state inspection and maintenance regulations. Launchers and receivers would be installed to support maintenance pigging and in-service inspections. All new pipeline segments would be designed to be pigged and inspected with these planned launchers and receivers. All manual and motor-operated valves on the system would be full port valves to allow for inspection and maintenance.

Pipeline Design, Construction, Maintenance, Operation, and Safety

The project design and construction would confirm to industry accepted best practices as well as all local, state, and federal requirements. Prior to pipeline startup, an Operating Manual and Integrated Contingency Plan would be developed. Pipeline would be operated and maintained per Company standard procedures and would comply with all applicable Company, local, state, and federal requirements.

Design consideration would include:

- Consultation with the jurisdictional state and federal regulatory agencies.
- Adherence to CFR Title 49 Part 192 "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards," appropriate sections of API, American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), National Association of Corrosion Engineers (NACE), and other applicable codes.
- Continued incorporation of the use of in-line inspection tools as noted in the Company Integrity Management Program.

Pipeline Safety considerations would include:

- Hydrostatic testing per USDOT regulations and retention of associated construction records.
- Non-destructive testing of all welded pipeline joints which meets or exceeds applicable standards per USDOT regulations.
- Installation of below ground warning tape above pipeline.

- Installation of aboveground pipeline location markers.
- Installation of security fencing when needed around valve and stations.
- Compliance with applicable California Occupational Safety and Health Administration administered regulations along with Company safety policies.
- Implementation of various on-site safety activities such as: completion of Job Safety Analysis, daily safety tailgate briefings, a Site-Specific Safety Procedure, and dedicated safety monitoring personnel.

Examples of safety considerations throughout operations and maintenance of the proposed facilities include continued:

- Compliance with CFR Title 49 Part 192 "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards," and appropriate sections of API, ANSI, ASME, NACE, and other applicable codes.
- Safety training for operations staff.
- Installation of supervisory control and supervisory control and data acquisition (SCADA) and pipeline monitoring devices.
- Maintenance inspections and retention of associated records as required by local, state, and federal regulations.

3.6.3 Health and Safety

The proposed project would adhere to all Kern County Improvement Standards to ensure accessibility for emergency vehicles and safe operation during construction or project operation. The proposed project would implement measures for worker safety during construction in accordance with California Division of Occupational Safety and Health regulations, guidance, and other BMPs. The proposed project would have an Emergency Response Plan (ERP). The ERP would address potential emergencies including chemical releases, fires, and injuries. All employees would be provided with communication devices, cell phones, or walkie-talkies, to provide aid in the event of an emergency.

To help ensure safety procedures are following, the proposed project would include safety training for construction workers and operational personnel. This would include both classroom and hands-on training in operating and maintenance procedures, general safety items, and the planned maintenance program. Training would include emergency procedures, fire prevention, and discussion of the location and proper use of emergency equipment. In addition, contact numbers for various local emergency response agencies, including fire, police, and medical services would be provided, and instruction for communication procedures to report potential health hazards and concerns would be a part of the training.

The proposed project also would include training on procedures to preventing electrical hazards that would reduce the potential for igniting combustible materials. The project also would limit

areas where employees can smoke and parking areas for both personal, heavy equipment, and for project operations would be provided over mineral soil, asphalt, or concrete and at a safe distance from dry vegetation.

3.6.4 Emergency Management

Emergency and Remedial Response Plan

The project would be governed by an Emergency and Remedial Response Plan that describes actions that the Owner/operator CRC shall take to address movement of the injection fluid or formation fluid in a manner that may endanger a USDW during the construction, operation, or post-injection site care periods. If the Owner/operator obtains evidence that the injected CO_2 stream and/or associated pressure front may cause an endangerment to a USDW, the Owner/operator must perform the following actions:

1. Initiate shutdown plan for the injection well.
2. Take all steps reasonably necessary to identify and characterize any release.
3. Notify the permitting agency (UIC Program Director) of the emergency event within 24 hours.
4. Implement applicable portions of the approved Emergency and Remedial Response Plan.

Injection wells would be configured with real-time injection rate, injection pressure, and annular pressure monitoring and alarms. The Operating Procedures plan details the maximum injection rate and pressure thresholds for alarms and shut-off devices.

A surface shut-off valve would be installed on the wellhead and configured with automation and communication to the central control facility (CCF). The valve would be utilized by the CCF operator remotely to respond to an emergency by shutting in the well. The valve would be configured to automatically shut-in the well if tubing or annular alarm thresholds are exceeded.

For these reasons, the Owner/operator CTV I would design wells with a surface shut-off valve at the wellhead and not a down-hole device.

Pipelines: Leak Detection and Response

CRC has extensive experience in safely installing and operating pipelines. CRC already operates more than 8,000 miles of pipelines in California that transport oil, water, and gas at various pressures. To ensure the highest levels of safety and environmental stewardship, the applicant has submitted their safety standards and procedures for each CO_2 transportation line, including but not limited to:

1. A rigorous design process with buried lines built and inspected to USDOT standards
2. 24/7/365 automated monitoring of the line, including automatic shutdown for potential leak scenarios

3. Health, safety and environmentally designed relief devices that prevent over pressuring the pipeline
4. Cathodic protection and external coatings to prevent external corrosion.
5. Dehydration systems that remove water from the CO_2 and prevent internal corrosion
6. Regular in-line inspections that scan the entirety of the pipeline and allow for early detection of areas in need of repair well before they become a concern
7. Robust training and operating procedures to prioritize safeguarding people and the environment in the design, operation and maintenance of our facilities and pipelines

The applicant is also proposing to develop comprehensive leak modeling in conjunction with Recognized and Generally Accepted Good Engineering Practices. To help further mitigate the potential impact of a leak and radius of exposure, additional site-specific measures would be implemented as appropriate:

1. Automated leak detection system that controls emergency shut down valves to isolate the leak from the CO_2 source
2. Recurring remote-operated valves that segment the line to limit the volume of gas that can leak
3. Engineered vents that divert a portion of the CO_2 away from the leak to a safe location
4. A robust Incident Management Plan with coordinated emergency response from all applicable public agencies

3.7 Decommissioning

Wells would undergo plugging and abandonment once storage capacity targets have been met. Idle wells that are not yet plugged and abandoned would be maintained in compliance with CalGEM regulations. The injection and monitoring well for the underground storage are in the EPA Class VI UIC permit would have specific requirements for decommissioning as well as continued monitoring and bonding for the long-term oversight of the mineralized CO_2 storage space. Specific mitigation measures would also apply on any approved permit from Kern County.

In decommissioning a formerly producing oil well, equipment such as pumping units, well cellars, facility pipelines, and other associated infrastructure would be disassembled and salvaged or appropriately disposed of. The same is valid for CO_2 injection and monitoring wells associated with geologic storage. Plugs of cement would be placed across specified intervals in the well casing to isolate oil and gas zones and to prevent degradation of usable waters. The well casing would be cut off below the surface, sealed with a cement plug, and a steel plate would be welded across the top of the casing. The well pad location would be restored to grade and allowed to revegetate. Typical construction equipment, such as bulldozers, motor graders, front end loaders, cement and dump trucks, and well workover rigs, would be utilized to accomplish this work. Work would be restricted to the pre-disturbed areas of the well pad, but some well plugging, and abandonments require

expansion of the existing well pads to accommodate equipment. Re-abandonment of a well may be required when there is evidence that the original plugging abandonment no longer retains its integrity.

Facilities such as production test setting, including pipe headers, tank farms, valve stations, or facility pipelines that are no longer needed for operations are dismantled and removed. The same is valid for injection facilities associated with CO_2 injection wells. The length of time necessary to decommission a facility depends on the size.

3.8 Entitlements Required

The Kern County Planning and Natural Resources Department as the lead agency (per the CEQA Guidelines Section 15052) for the proposed project has staff responsibility for the preparation of the EIR and recommendations to the decision makers on the proposed project. To implement this project, the project proponent may need to obtain discretionary and ministerial permits/approvals including, but not limited to, the following:

Federal

- U.S. Environmental Protection Agency Underground Injection Control – Class VI Permit
- U.S. Fish and Wildlife Service Section 10 Incidental Take Permit and Habitat Conservation Plan (if required)

State

- California Department of Fish and Wildlife
- Section 2081 Permit (State-listed endangered species) (if required)
- 401 Water Quality Certification Central Valley Water Regional Quality Control Board (RWQCB)
- Waste Discharge Requirements (RWCQB)
- National Pollution Discharge Elimination System Construction
- State Fire Marshal Approval of CO_2 Pipeline
- California Geologic Management – California Department of Conservation California Air Resources Board
- Department of Conservation
- Permit for Transport of Oversized Loads (if required)

Local

- Certification of Final Environmental Impact Report
- Adoption of 15091 Findings of Fact and 15093 Statement of Overriding Considerations Adoption of Mitigation Monitoring and Reporting Program
- Approval of Zone Changes
- Approval of Conditional Use Permits
- Approval of Kern County Building Permits
- Approval of Kern County Encroachment Permits (if required)
- San Joaquin Valley Air Pollution Control District
  - Approval of Fugitive Dust Control Plan
  - Authority to Construct

3.9 Cumulative Projects

CEQA requires that an EIR evaluate a project's cumulative impacts. Cumulative impacts are the project's impacts combined with the impacts of other related past, present and reasonably foreseeable future projects. As set forth in the CEQA Guidelines, the discussion of cumulative impacts must reflect the severity of the impacts, as well as the likelihood of their occurrence; however, the discussion need not be as detailed as the discussion of environmental impacts attributable to the project alone. As stated in CEQA, Public Resources Code, Section 21083(b) (2), "a project may have a significant effect on the environment if the possible effects of a project are individually limited but cumulatively considerable."

According to the CEQA Guidelines:

Cumulative impacts refer to two or more individual effects, which, when considered together, are considerable and which compound or increase other environmental impacts.

(a) The individual effects may be changes resulting from a single project or a number of separate projects.

(b) The cumulative impact from several projects is the change in the environment, which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (CCR [California Code of Regulations], Title 14, Division 6, Chapter 3, §15355).

In addition, as stated in the CEQA Guidelines, it should be noted that:

The 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 (CCR, Title 14, Division 6, Chapter 3, Section 15064[I][5]).

Cumulative impact discussions for each environmental topic area are provided at the end of each technical analysis contained within Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*, under "Impacts and Mitigation Measures." As previously stated, and as set forth in the CEQA Guidelines, related projects consist of "closely related past, present, and reasonably foreseeable probable future projects that would likely result in similar impacts and are located in the same geographic area" (CCR, Title 14, Division 6, Chapter 3, Section 15355).

CRC has named other CCS projects outside Kern County, as "Carbon TerraVault" with various other numbers (example, III, IV, V) in EPA UIC applications. Those projects are within San Joaquin County (over 234 miles north) and have multiple sources announced related to those projects - Grannus (blue ammonia and hydrogen) and Yosemite Energy (renewable fuel from wood waste). Neither the Northern California Carbon TerraVault Projects or their proposed associated sources are located anywhere in Kern County, are not being permitted by Kern County or are not relevant to this EIR. Cumulative projects are shown in Table 3-8.

Table 3-8: Cumulative Projects

Name	Project Location	Project	Zone Map	Section/ Township/ Range	Approx Acreages	Status
Salt Creek Carbon Capture and Storage	West Lokern Road and Lost Hills Road	CCS	96	Multiple	4,000	Application incomplete
CarbonFrontier Capture and Storage	Lerdo Hwy and SR 33	CCS	51 / 74 / 75	Multiple	12,728	EIR in Process
Eastridge Carbon Capture and Storage Project	China Grade Loop and Round Mountain Road	CCS	Multiple	Multiple	7,343	EIR in Process
Pond Road Biomass Carbon Removal and Storage Project	SR 99 and Pond Road	CCS	9-25	25 / 25S / 25E	118	Application incomplete
Avnos, Inc	Unknown (Elk Hills)	Direct Air Capture w/ CCS	Unknown	Unknown	20	Not submitted – media PR
Lone Cypress Energy Services	Elk Hills Road and Skyline Road	Blue Hydrogen Project	112	35 / 30S / 23E	28	Application withdrawn

Table 3-8: Cumulative Projects

Name	Project Location	Project	Zone Map	Section/ Township/ Range	Approx Acreages	Status
Oil and Gas Development under Kern County Oil and Gas Development	San Joaquin Valley Floor portion of Kern County	Revisions to Title 19 of the Kern County Zoning Ordinance	Multiple	Multiple	Multiple	Second Supplemental Recirculated EIR in process
Crimson Resource Management Oil and Gas CUP	West of I-5, North SR 46, and East of Holloway Road	CUP Oil and Gas Extraction	4	34 & 35 / 25S / 20E	800	Application incomplete
AERA Energy Oil and Gas CUP	Seventh Standard Road and SR 33	CUP Oil and Gas Extraction	74 / 75 / 96	Multiple	650	EIR in process
CRC Oil and Gas CUP – Buena Vista	SR 119 and Midway Road	CUP Oil and Gas Extraction	Multiple	Multiple	23,167	Application incomplete
CRC Oil and Gas CUP – Elk Hills	Skyline Road and SR 119	CUP Oil and Gas Extraction	Multiple	Multiple	54,196	Application incomplete
CRC Oil and Gas CUP – Kern Front	SR 65 to the West, Southwest by James Road, and on the East by Granit Road	CUP Oil and Gas Extraction	81	Multiple	4,168	Application incomplete
InEnTec (collaboration with CRC)	Unknown (Elk Hills)	Renewable dimethyl either with CCS	Unknown	Unknown	Unknown	Not submitted - media PR
Verde Clean Fuels (collaboration with CRC)	Unknown (Elk Hills)	Renewable fuel - Agricultural Waste/CCS	Unknown	Unknown	Unknown	Not submitted - media PR
NLC Energy LLC	Unknown (Elk Hills)	Waste to Energy (CCS)	Unknown	Unknown	Unknown	Not submitted - media PR
CTV Clean Energy Park	Unknown (Elk Hills)	Multiple Projects	Unknown	Unknown	Unknown	Not submitted - media PR
Coles Levee Carbon Capture and Storage Project (CRC)	Unknown (North and South Coles Levee Oil Field	CCS	Unknown	Unknown	Unknown	Not submitted - media PR
Kern Store Carbon Capture and Storage Project (CRC)	Unknown (North and South Coles Levee Oilfield, Elk Hills Oilfield	CCS	Unknown	Unknown	Unknown	Not submitted - media PR

Table 3-8: Cumulative Projects

Name	Project Location	Project	Zone Map	Section/ Township/ Range	Approx Acreages	Status
A2 Place Carbon Capture and Storage Project (CRC)	Unknown (North and South Coles Levee Oilfield, Elk Hills Oilfield	CCS	Unknown	Unknown	Unknown	Not submitted - media PR
Capture of Existing Oilfield Steam Generators	Unknown	Carbon Capture and Transport for Storage	Unknown	Unknown	Unknown	Not submitted - media PR
Existing Gas Power Plants (two)	Unknown	Carbon Capture and Transport for Storage	Unknown	Unknown	Unknown	Not submitted - media PR
Direct Air Capture	Unknown (Elk Hills)	Direct Air Capture with CCS	Unknown	Unknown	Unknown	Not submitted - media PR

Key:
CCS = carbon capture and storage
CUP = Conditional Use Permit
EIR = environmental impact report
I-5 = Interstate 5
PR = press release
SR = State Route

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Chapter 4

Environmental Setting, Impacts, and Mitigation Measures

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Section 4.1

Aesthetics and Visual Resources

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Section 4.1

Aesthetics and Visual Resources

4.1.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for aesthetics and visual resources. It also describes the impacts on aesthetics and visual resources that would result from implementation of the California Resources Corporation's (project proponent's) proposed Carbon TerraVault I (Kern County) Project (project). The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the city of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

Degradation of the visual character of a site is usually addressed through a qualitative evaluation of the changes to the aesthetic characteristics of the existing environment and the project-related modifications that would alter the visual setting. The evaluation of impacts to aesthetic resources in this section considers whether the project would directly or indirectly affect a protected resource and the existing visual character or quality of public views at the project footprint and its surroundings.

Aesthetics, as addressed in the California Environmental Quality Act (CEQA), refers to visual considerations in the physical environment. Because a person's reaction and attachment to a given viewshed are subjective, visual changes inherently affect viewers differently. Accordingly, aesthetics analysis, or visual resource analysis, is a systematic process to logically assess visible change in the physical environment and the anticipated viewer response to that change. The Aesthetics section of this EIR describes the existing landscape character of the project site, existing views of the area from various on-the-ground vantage points, the visual characteristics of the proposed project, and the landscape changes that would be associated with the project, as seen from various vantage points.

The analysis in this section is based on the Kern County (County) *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015), supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022, (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

A description of the environmental setting (affected environment) for aesthetics and visual resources is presented below in Section 4.1.2, *Environmental Setting*, including discussion of the regional and local character, including state scenic highways within the vicinity of the project site and existing sources of light and glare. The regulatory setting applicable to aesthetics and visual resources is presented in Section 4.1.3, *Regulatory Setting*, and Section 4.1.4, *Impacts and Mitigation Measures*, discusses project impacts and associated mitigation measures.

Visual Concepts and Terminology

When viewing the same landscape, people may have different responses to that landscape and any proposed visual changes based upon their values, familiarity, concern, or expectations for that landscape and its scenic quality. Because each person's attachment to and value for a particular landscape is unique, visual changes to that landscape inherently affect viewers differently. However, generalizations can be made about viewer sensitivity to scenic quality and visual changes. Recreational users (e.g., hikers, equestrians, tourists, and people driving and cycling for pleasure) are expected to have high concern for scenery and landscape character. People who are commuting daily through the same landscape generally have a moderate concern for scenery, while people working at industrial sites generally have a lower concern for scenic quality or changes to existing landscape character. The visual sensitivity of a landscape is also affected by the viewing distances at which it is seen, such as closeup or far away. In addition, the visual sensitivity of a landscape is affected by the travel speed at which a person is viewing the landscape (high speeds on a highway, low speeds on a hiking or cycling trail, or stationary at a residence). Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that contribute to the public's experience and appreciation of the environment. 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 following terms and concepts are used in the discussion below to describe and assess the aesthetics setting and impacts from the project:

- **Visual (Sensitive) Receptor**: Any scenic vista, designated scenic highway, residence, or public recreational area located within the project viewshed that provides people with views of a site.
- **Scenic Highway:** Any stretch of public roadway that is designated as a scenic corridor by a federal, state, or local agency.
- **Scenic Vista:** An area that is designated, signed, and accessible to the public for the express purposes of viewing and sightseeing. This includes any such areas designated by a federal, state, or local agency. Scenic vistas can also include an area that is designated, signed, and accessible to the public for the express purposes of viewing and sightseeing.
- **Viewshed**: The viewshed for a project is defined as the surrounding geographic area from which the project is likely to be seen, based on topography, atmospheric conditions, land use patterns, and roadway orientations. "Project viewshed" is used to describe the area

surrounding a project site where a person standing on the ground or driving a vehicle can view the project site.

- **Vividness:** The visual power or memorability of landscape components as they combine in distinctive visual patterns.
- **Intactness**: The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.
- **Unity:** The degree to which the visual resources of the landscape join to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or intercompatibility between landscape elements.
- **Visual Sensitivity:** When viewing the same landscape, people may have different responses to that landscape and any proposed visual changes based upon their values, familiarity, concern, or expectations for that landscape and its scenic quality. Because each person's attachment to and value for a particular landscape is unique, visual changes to that landscape inherently affect viewers differently. However, generalizations can be made about viewer sensitivity to scenic quality and visual changes.
- Recreational users (e.g., hikers, equestrians, tourists, and people driving and cycling for pleasure) are expected to have high concern for scenery and landscape character. People who are commuting daily through the same landscape generally have a moderate concern for scenery, while people working at industrial sites generally have a lower concern for scenic quality or changes to existing landscape character.
- The visual sensitivity of a landscape is also affected by the viewing distances at which it is seen, such as closeup or far away. In addition, the visual sensitivity of a landscape is affected by the travel speed at which a person is viewing the landscape (high speeds on a highway, low speeds on a hiking or cycling trail, or stationary at a residence). Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that contribute to the public's experience and appreciation of the environment. 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.

4.1.2 Environmental Setting

Regional Character

Kern County is geographically California's third largest county, encompassing 8,202 square miles at the southern end of the Central Valley. The project site encompasses approximately 9,104 acres within the approximately 75-square-mile (47,800-acre) Elk Hills complex in the San Joaquin Valley of unincorporated Kern County.

The Kern County General Plan (KCGP) describes the San Joaquin Valley region as "the southern San Joaquin Valley below an elevation of 1,000 feet mean sea level" within the County. The San Joaquin Valley portion is characterized by relatively low rainfall, averaging less than 10 inches per

year. Average temperatures are relatively high, and total evaporation exceeds total precipitation. Summers are relatively cloudless, hot, and dry. Winter is generally mild, but an occasional freeze does occur and may cause substantial agricultural damage. The average length of the growing season is 265 days. The San Joaquin Valley region is within the Tulare Lake Groundwater Basin, which includes the Kern River Hydrographic Unit and the Poso Hydrographic Unit.

Most of the terrain within the region is flat to gently rolling with some hilly and steeply rolling terrain near the west, south, and east (Figure 4.1-1). The central part of the region is mostly flat and contains a variety of wetlands with natural vegetation. Several stream corridors that descend into the valley from the east, including the Kern River, also contain natural riparian vegetation. However, most of the region consists of diverse agricultural croplands, orchards, and grazing lands, or oil and gas development, and oil and gas facilities are often interspersed in the agricultural areas. In the more urbanized portions of the region, a combination of residential, commercial, and industrial scenes dominate the views, with smaller amounts of recreational, open space, and other typical urban structures and activities. Urban land uses and associated views occur in a small portion (approximately 2 percent) of the overall region. Outside of the urbanized areas, the predominant land uses and associated views are agricultural, oil and gas-related uses, and recreational and other open space. Within agricultural lands, views include irrigated and non-irrigated lands, row crops and orchards, rangeland, and support and processing facilities. Views of agricultural lands are considered an important attribute of the County's visual character and quality. Areas with existing oil and gas development likewise can include a variety of land disturbance, facilities, uses, and intensities, with corresponding views.

Local Character

The project footprint, encompassing 25 parcels, is located on the west side of Elk Hills Road and to the north of Skyline Road, within the administrative boundary of Elk Hills. The boundaries of the carbon capture and storage (CCS) Surface Land Area and Underground Approved Storage Area (Pore space) for the project area is approximately 26 miles from the city of Bakersfield, approximately 8.5 miles from the city of Taft, approximately 5 miles from the unincorporated community of Tupman, and approximately 4 miles from the unincorporated community of Buttonwillow. The closest injection well or capture facility site is approximately 6 miles from the unincorporated community of Buttonwillow, approximately 6 miles from the unincorporated community of Tupman, approximately 8.5 miles from the city of Taft, and approximately 26 miles from the city of Bakersfield.

The project is bounded by the Elk Hills and Buena Vista Hills, two anticlinal ridges that run southeast to northwest. Numerous steep draws and dry stream channels characterize the site. Alluvial plains and flat valley lands occur around the perimeter of the reserves. Elevations range from 289 to 1,552 feet. According to observations from National Aeronautics and Space Administration satellites, which captured an image of Elk Hills in 2009, the Elk Hills surface is "a combination of hilly terrain and human development, with gravel roads and bare ground surrounding oil wells alternating with vegetated land. A canal separates the oilfield from nearby agricultural lands, which appear as neat rectangles of varied shades of green," and "in contrast to the oilfield, the surrounding agricultural fields rest on flat land" (see Figure 4.1-1) (NASA 2009).

The project site is located within Elk Hills, which is heavily developed with oil wells and associated infrastructure. The aesthetic features of the existing visual environment in the area are varied, with agricultural and oil production/extraction equipment dominating the landscape (see Figure 4.1-1 through Figure 4.1-6). As such, there are no unique aesthetic features or identified scenic vistas in the project vicinity.

State Scenic Highways

Regional access to Elk Hills is via the numerous highways that traverse the area, including Interstate 5 and State Routes (SR) 33, 58, 65, and 119. According to the California Department of Transportation (Caltrans) California Scenic Highway Mapping System, there are no Designated State Scenic Highways or scenic resources in the project site (Caltrans 2019). Two Eligible State Scenic Highway sections, SR 14 and SR 58, are located approximately 30 miles east of the project site and, therefore, are not within viewing distance of the project. Portions of the project site may be visible from public roads, such as Elk Hills Road, Skyline Road, and North Access Road; however, the project site is currently dominated by oil and gas production facilities and associated infrastructure.

Lighting Environment

Light and Glare

Lighting effects are associated with the use of artificial light during the evening and nighttime hours. Existing sources of light and glare occur throughout the project site as part of existing oil and gas facilities. Glare is reflective light that can be visually unpleasant or possibly unsafe due to the potential for temporary blindness. Glare is primarily a daytime occurrence that may be caused by light from artificial sources or the sun reflecting off of light-colored or smooth, highly polished surfaces, such as metal, glass, water, or polished stone. Glare intensity varies depending on the source and intensity of the light, time of day, time of year, angle of reflectance, weather, atmospheric conditions, the reflectivity, color, and texture of material surface finish, length of exposure, nature and sensitivity of receptors, and other factors.

The Elk Hills is currently being used for oil and gas production. Developed portions are occupied by oil and gas production facilities and infrastructure, such as dirt roads, well pads, wells, pipelines, and production equipment. The project site includes existing light poles along Elk Hills Road and Skyline Road. The existing Elk Hills Power Plant facility includes existing light poles in its parking areas and external lighting on its structures. Facilities off site of Skyline Road also include light poles and floodlights. There are no existing light poles along roads that extend from Skyline Road within Elk Hills. The existing infrastructure at Elk Hills is also primarily constructed with metal, which may be a source of glare during certain times of the day to vehicles passing by. Because the majority of the area surrounding Elk Hills is vacant, there are no substantial light sources in the immediate vicinity. Additionally, because the surrounding areas are used for agriculture and industrial uses, no sensitive light receptors are located near the proposed project. The closest sensitive receptor to the project site is McKittrick Elementary School, which is located 4.46 miles from injection well 357-7R and its associated pipeline. The nearest residence is approximately 4.5

miles southeast of the injection line and 4.4 miles from injection well 345-36R. Buttonwillow Recreation and Park District is located approximately 7 miles northeast of injection well 355-7R and 6.9 miles from the underground injection pipeline.

4.1.3 Regulatory Setting

This section describes the federal, state, and local statutes, ordinances, or policies that govern the light, glare, viewshed, and scenic character that must be considered by the County during the decision-making process for projects that have the potential to affect aesthetics.

Federal

U.S. Department of Agriculture, Forest Service

The National Trails System Act (NTSA) of 1969 seeks to preserve scenic and natural qualities along trails and recognizes the rights of private landowners and provides that "full consideration shall be given to minimizing the adverse effects upon the adjacent landowner or user and his operation" in the development and use of a trail (NPS 2019). The NTSA assigns management responsibility for trails to various federal resource agencies, depending on which agency holds jurisdiction over the public lands on which the trail is located in a given area (i.e., U.S. Forest Service, National Park Service, or the Bureau of Land Management).

The Pacific Crest Trail was created under the NTSA to provide for outdoor recreation opportunities and the conservation of significant scenic, historic, natural, or cultural qualities. The Pacific Crest Trail stretches 2,650 miles from Mexico to Canada through California, Oregon, and Washington and is designated in the KCGP as a scenic feature. The U.S. Forest Service administers the Pacific Crest Trail in the vicinity of the project. The Pacific Crest Trail is located 60 miles beyond the project area at its closest point. Therefore, project compliance with the NTSA was not considered in this analysis, and no regulations would be applicable for development of CCS facilities in the project area because the project area would not be visible from the Pacific Crest Trail.

State

California Scenic Highway Program

The California's Scenic Highway Program was created by the State Legislature in 1963 (Caltrans 2023). The purpose of this program is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The state laws governing the Scenic Highway Program are found in the Streets and Highways Code, Section 260 et seq. Caltrans manages the State Scenic Highway Program, provides guidance, and assists local government agencies, community organizations, and citizens with the process to officially designate scenic highways.

Figure 4.1-1: Photo Locations

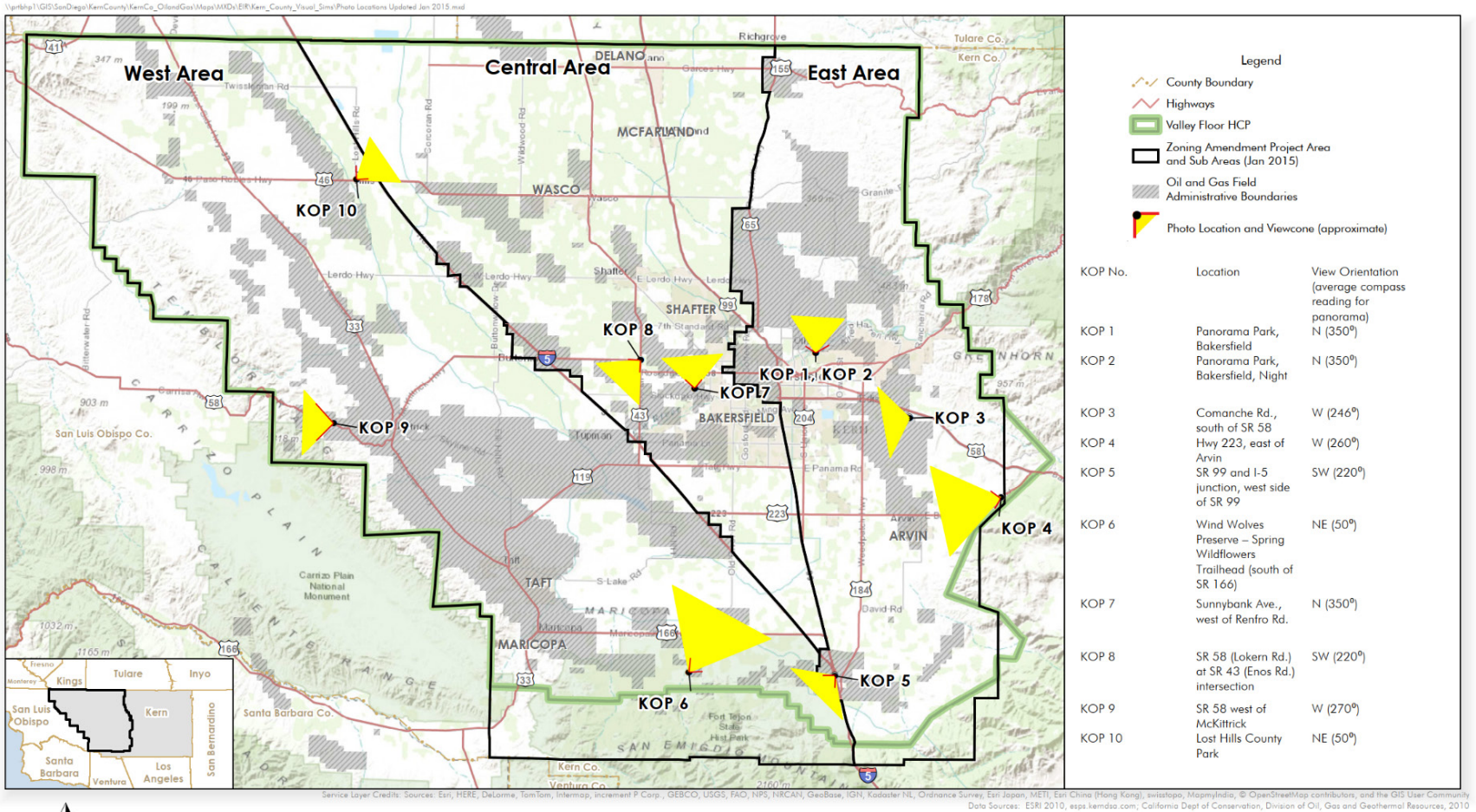

Figure 4.1-1
Photo Locations

Figure 4.1-2: Photo Locations, Existing Views for KOP 1 and KOP 2

View looking north from Panorama Park in north Bakersfield toward the existing oil and gas development fields. This KOP represe nts day-time views for park visitors.

Night-time view looking north from Panorama Park in north Bakersfield toward the existing oil and gas development fields. This KOP represents night-time views for park visitors.

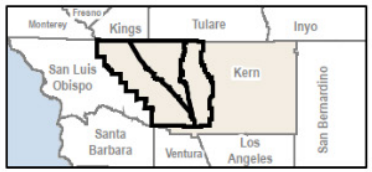

Figure 4.1-2
Existing Views for KOP 1 and KOP 2

Photo Locations

Figure 4.1-3: Photo Locations, Existing Views for Key Observation Points 5 and 6

View looking west from Comanche Road south of SR 58 in the eastern part of the Project Boundary Area. This KOP represents typi cal views of agricultural lands with some scattered oil and gas facilities.

View looking west from an overlook along Highway 223 east of the community of Arvin in the eastern portion of the Project Boundary Area. This KOP represents views for motorists and others traveling westbound on Highway 223 and descending into the San Joaquin Valley through the foothills of the southern Sierra Nevada.

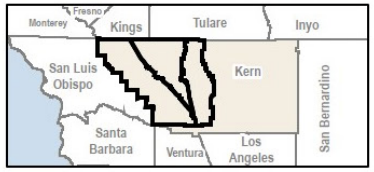

Figure 4.1-3
Existing Views for KOP 3 and KOP 4

Photo Locations

Figure 4.1-4: Photo Locations, Existing Views for Key Observation Points 5 and 6

View looking southwest near the junction of SR 99 and I-5 in the southern portion of the Project Boundary Area. This KOP is lo cated on a frontage road adjacent to and just west of SR 99 and represents views for motorists and others travelling southbound on SR 99 and I-5.

View looking northeast from the Spring Wildflowers Trailhead in the Wind Wolves Preserve in the southern portion of the Proj ct Boundary Area. This KOP represents views across the southern San Joaquin Valley for visitors to the open space preserve.

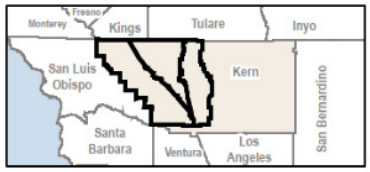

Figure 4.1-4
Existing Views for KOP 5 and KOP 6

Photo Locations

Figure 4.1-5: Photo Locations, Existing Views for Key Observation Points 7 and 8

View looking north from Sunnybank Avenue, west of Renfro Road, in the central portion of the Project Boundary Area west of theCity of Bakersfield. This KOP represents views within predominantly residential areas where oil and gas facilities occur in close proximity to residences.

View looking southwest from the intersection of SR 58 (Lokern Road) and SR 43 (Enos Road) in the central portion of the Proje ct Boundary Area west of the City of Bakersfield. This KOP represents typical views of agricultural lands with scattered rural residences and some oil and gas facilities.

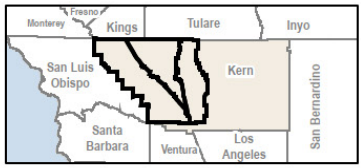

Figure 4.1-5
Existing Views for KOP 7 and KOP 8

Photo Locations

Figure 4.1-6: Photo Locations, Existing Views for Key Observation Points 9 and 10

View looking west along SR 58 in the western portion of the Project Boundary Area. This KOP represents views for motorists and others travelling westbound on SR 58 toward the Carrizo Plain and Central Coast region in San Luis Obispo County.

View looking northeast from Lost Hills County Park near the edge of the small community of Lost Hills in the northwestern portion of the Project Boundary Area. This KOP represents typical views of open lands within this general area.

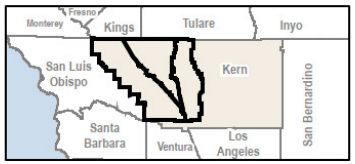

Figure 4.1-6
Existing Views for KOP 9 and KOP 10

Photo Locations

A highway may be designated as scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. The California Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated. The status of a state scenic highway changes from eligible to officially designated when the local jurisdiction adopts a scenic corridor protection program, applies to Caltrans for scenic highway approval, and receives notification from Caltrans that the highway has been designated as a scenic highway (Caltrans 2023).

Several highways and state routes are located within the region that provide access to the project site. The project site is not in proximity to any Designated State Scenic Highways or scenic resources.

Kern County

Kern County General Plan

The project site is located within the KCGP area and, therefore, would be subject to applicable policies and measures of the KCGP. The Land Use, Conservation, and Open Space Element; the Circulation Element; and the Energy Element of the KCGP include goals, policies, and implementation measures related to aesthetics that apply to the project, as described below.

The Land Use, Conservation, and Open Space Element of the KCGP evaluates the visual and aesthetic setting of Kern County and assesses the potential for visual impacts. The KCGP Circulation Element provides guidelines for development near scenic routes. A scenic route is defined in the KCGP as any freeway, highway, road, or other public right-of-way that traverses an area of exceptional scenic quality. A roadway can only be designated as a scenic route by direct action of the County Board of Supervisors or the State of California. A route may not be selected as scenic until a visual assessment has been conducted to determine if the route meets the current scenic highway criteria as mentioned above, and to what extent development has encroached on the scenic views. In addition, the County must prepare and adopt a plan and program for the protection and enhancement of adjacent roadside viewshed land. No scenic routes have been designated in the project site.

Chapter 1. Land Use, Conservation, and Open Space Element

1.10.7. Light and Glare

Policies

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.

Implementation Measures

Implementation Measure AA. The County shall utilize California Environmental Quality Act Guidelines and the provisions of the Zoning Ordinance to minimize the impacts of light and glare on adjacent properties and in rural undeveloped areas.

Chapter 2. Circulation Element

2.3.9. Scenic Route Corridors

None of the goals, policies, or implementation measures contained in Section 2.3.9 are applicable to the proposed project.

Kern County Zoning Ordinance

Chapter 19.81, Outdoor Lighting "Dark Skies Ordinance "

Chapter 19.81 of the Kern County Zoning Ordinance implements requirements for outdoor lighting unincorporated areas of Kern County in order to accomplish the following objectives:

1. Encourage a safe, secure, and less light-oriented nighttime environment for residents, businesses, and visitors.
2. Promote a reduction in unnecessary light intensity and glare, and to reduce light spillover onto adjacent properties.
3. Protect the ability to view the night sky by restricting unnecessary upward projections of light.
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.

Kern County Development Standards

The Kern County Development Standards have specific regulations pertaining to lighting standards, including the requirement that lighting must be designed so that light is reflected away from surrounding land uses so as not to affect or interfere with vehicular traffic, pedestrians, or adjacent properties.

Kern County Specific Plans

Kern County has adopted 24 Specific Plans. These Specific Plans are intended to be an amplification of the goals and policies of the KCGP and are, therefore, consistent therewith. The project site is not located wholly or partially within any adopted Specific Plan areas.

4.1.4 Impacts and Mitigation Measures

This section describes the impact analysis relating to aesthetics and visual resources for the proposed project. It describes the methods used to determine the impacts of the project and lists the

thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, where applicable.

Methodology

In general, the potential character, quality, light, and glare impacts associates with projects are evaluated on a qualitative basis. The potential impacts to aesthetics and visual resources within the vicinity of the project site were qualitatively evaluated based on the following criteria: (1) existing visual quality and scenic attributes of the landscape; (2) location of sensitive receptors in the landscape; (3) assumptions about receptors' concern for scenery and sensitivity to changes in the landscape; (4) the magnitude of visual changes in the landscape that would be brought about by implementation, construction, and operation of the proposed project; (5) compliance with State, County, and local policies for visual resources; and (6) the significance threshold questions in relation to aesthetics contained in Appendix G of Kern County's CEQA Implementation Document and Environmental Checklist.

Visual Characteristics

As stated in the Environmental Setting section, this project is located entirely within Elk Hills, which is heavily developed with oil wells and associated infrastructure. While the aesthetic features of the existing visual environment in the area are varied, agricultural and oil production/extraction equipment dominate the landscape. See Figure 4.1-7 for photos of some of the existing facilities. The project elements that will be introduced are similar looking to the existing features and are shown in Figure 4.1-8. These features of the proposed project are consistent with the existing landscape, and that of other typical oilfields, thus no unique aesthetic features exist within the project vicinity.

Sensitive Viewers

Viewer sensitivity or concern is based on the visibility of resources in the landscape, the proximity of viewers to visual resources, the elevational position of viewers relative to visual resources, the frequency and duration of views, the number of viewers, and the type of expectations of individuals and viewer groups. The project footprint is confined to an existing oilfield with minimal public visibility due to the lack of public access to the area. The volume, frequency, and duration of views of the proposed project would be low and viewers primarily would be people driving to and from work or as part of their work who would not perceive any additional concern regarding the scenery or have a sensitivity to the changes in the landscape as a result of this project. Additionally, there are no scenic vistas, and the closest sensitive receptor to the project site is McKittrick Elementary School, which is located 4.46 miles southwest from injection well 357-7R and its associated facility pipeline. The nearest residence is approximately 4.5 miles southeast of the injection line and 4.4 miles from injection well 345-36R. The Buttonwillow Recreation and Park District is located approximately 7 miles northeast of injection well 355-7R and 6.9 miles from the injection pipeline.

Figure 4.1-7: Photos of Existing Conditions

CGP-1 Facility

Carbon Dioxide (CO_2) Capture Area at CGP-1

Elk Hills Power Plant

Figure 4.1-8: Typical Project Elements

Pipeline Right-of-Way Corridor – New pipeline will be buried adjacent to existing pipeline.

Existing Water Injection Well (CLASS VI UIC CO_2 Injection Well will look identical)

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist state that a project would have a significant impact on aesthetics and visual resources if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

The project area is confined to an existing oilfield with minimal public visibility due to the lack of public access to the area. Therefore, the proposed project would have little or no effect on sensitive viewers because the volume, frequency, and duration of views of the proposed project would be low and viewers primarily would be people driving to and from work or as part of their work. Based on these standards, the effects of the project have been categorized as a "less than significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a "significant unavoidable impact."

Project Impacts

The amount of potential visual change that would be introduced into the existing landscape and the degree to which viewers are likely to be impacted and react to the change are described below for each applicable threshold of significance. Impacts associated with implementation of the project include construction, operation, well stimulation, and decommissioning/abandonment. As previously discussed, Figures 4.1-7 and 4.1-8 illustrate typical photos of the relevant project features that could occur within the project viewshed.

Impact 4.1-1: Have a Substantial Adverse Effect on a Scenic Vista

There are currently no scenic vistas within the project area. Therefore, future CCS activities that would be authorized would not result in significant impacts related to having a substantial adverse effect on a scenic vista during construction, operation, or decommissioning/abandonment.

Mitigation Measures

No mitigation measures are proposed.

Level of Significance

Impacts would be less than significant.

Impact 4.1-2: Substantially Damage Scenic Resources, including, but Not Limited to, Trees, Rock Outcroppings, and Historic Buildings within a State Scenic Highway

There are currently no Designated State Scenic Highways within the project area. Therefore, the project would not substantially damage any scenic resources within a Designated or Eligible State Scenic Highway within the project area, and there would be no substantial aesthetic impacts for construction, operation, well stimulation, or decommissioning/abandonment.

Mitigation Measures

No mitigation measures are proposed.

Level of Significance

Impacts would be less than significant.

Impact 4.1-3: Substantially Degrade the Existing Visual Character or Quality of the Site and Its Surroundings

Impacts on the existing visual character or quality of the site and its surroundings due to construction, operation, or decommissioning of CCS facilities could result from implementation of the project. Aesthetic impacts may result in a substantial change to the landscape character or reduction in scenic quality.

Construction Impacts

Short-term impacts on the existing visual character or quality of a site and its surroundings may occur during construction. Construction-related activities would largely occur in areas with existing oil and gas operations. All equipment would be assembled off site and transported to the proposed location for installation, thus minimizing the duration of a visual impact during construction.

The project would include establishing and using a temporary construction corridor and temporary storage and laydown areas. The temporary construction corridor right-of-way, of up to approximately 12 feet in width, would be established along areas of the pipeline route not accessible via established roads or other existing cleared areas to allow for off-road construction equipment and a travel path. Temporary storage and laydown areas outside of the right-of-way would be used to store equipment, pipe, and materials, and to stage construction activities. Laydown areas are designed to minimize new disturbance by using existing, cleared areas, such as fields, parking lots, or other developed areas. During construction, these areas would have a change in their visual quality; however, following completion of construction, all laydown areas would be returned to pre-project contours and revegetated to native habitat conditions.

Staging areas may be required for material handling, temporary storage, and project staging activities. In addition, concrete batch plants would be temporarily located within the project site during the construction phase.

Short-term impacts could result from land clearing and grading for pads and work areas, temporary construction access roads, temporary construction areas, and vehicle and equipment operations for facility construction. Short-term aesthetic impacts could result from a reduction in unity, intactness, or vividness created by vegetation removal, grading that noticeably alters existing landforms, and materials, equipment, vehicles, structures, fences, and other elements that would be present during construction.

Vehicle and equipment operations may produce visible dust during land-clearing operations and from traveling on unpaved roadways. Drill rigs, and possibly cranes, are likely to be visible from long distances silhouetted against the sky, especially in the flatter and more open landscapes within the project area. Ground-level activities, such as land clearing and site preparation, require equipment, such as bulldozers, excavators, loaders, and dump trucks. Foundation and facility construction activities would require large delivery vehicles and concrete trucks. The local increase in general vehicular traffic could be a source of visual impact, depending upon the number of trips to and from a specific area. On-site parking could be noticeable during construction if certain sites require a larger number of workers and, consequently, their vehicles. Nighttime lighting for construction or safety and security in construction areas may also result in short-term aesthetic impacts; these impacts associated with creating new sources of substantial light or glare are addressed separately under Impact 4.1-4.

The severity of construction-related aesthetic impacts would depend not only on the reduction in unity, intactness, and vividness produced by the construction activities, but also on the visibility and proximity of these activities to viewers and the sensitivity of viewers to changes in the landscape's character and quality. As stated previously, the lack of sensitive receptors within and adjacent to the project footprint and surrounding area would reduce the level of this impact. Additionally, activities may be temporary and somewhat brief (i.e., on the order of several weeks to several months).

Throughout the project's construction, impacts to aesthetics and visual resources could result in potentially significant impacts; therefore, Mitigation Measures (MM) 4.1-1 through MM 4.1-4 would be required to reduce these potential impacts to a less than significant level.

Operational and Decommissioning Impacts

Upon completion of all construction activities, the project proponent would ensure that the facility would be properly operated and maintained. The project proponent would develop an operations and maintenance protocol to be implemented throughout the life of the project. The protocol would specify routine maintenance and operation, which typically adheres to the maintenance program developed by the project proponent. Operation and maintenance personnel would also inspect access roads, crane pads, and trenched areas regularly and maintain them to ensure minimal erosion and maintenance of the visual character of the site.

Following completion of the project, the construction equipment would be removed. Long-term impacts on the existing visual character or quality of the site would be minimal, given that the existing area and its surroundings already contain similar looking facilities. However, increased

numbers of structures, especially ones with different forms or colors, may add to the texture of existing structures and increase contrast in the landscape.

Figures 4.1-7 above, show the typical project elements, including (1) monitoring well, (2) injection well, and (3) capture equipment.

Wells would undergo plugging and abandonment once storage capacity targets have been met. In decommissioning, all injection and monitoring wells and associated infrastructure would be disassembled and salvaged or appropriately disposed of. The well pad location would be restored to grade and allowed to revegetate. Typical construction equipment, such as bulldozers, motor graders, front end loaders, cement and dump trucks, and well workover rigs, would be used to accomplish this work.

Various facilities or facility pipelines that are no longer needed for operations would be dismantled and removed. The same would apply for injection facilities associated with CO_2 injection wells.

The extent of impacts to aesthetics and visual resources during project operations and decommissioning could result in potentially significant impacts; therefore, MM 4.1-1 through MM 4.1-4 would be required to reduce these potential impacts to a less than significant level.

Mitigation Measures

MM 4.1-1 All derricks, boilers, and other drilling equipment used to drill, repair, clean out, deepen, or redrill any well shall be removed from the drill site within 90 days after completion or after abandonment of any well. Earthen sumps used in drilling shall be filled within 90 days after any well has been placed in production (unless such sumps are to be used within six months for the drilling of another well), and any sump used in productions shall be filled after its abandonment and restored to a uniform grade within ninety days.

MM 4.1-2 Sumps and ponds shall be permitted only to the extent authorized by the Central Valley Regional Water Quality Control Board (via waiver, Waste Discharge Requirements, or other form of authorized written documentation) and shall comply with all applicable legal requirements and mitigation measures for sumps serving as storage, percolation or evaporation ponds for produced water.

MM 4.1-3 Project signage is limited to directional, warning, safety, security, and identification signs in connection with oil, gas, or other hydrocarbon drilling and development operations in accordance with Chapter 19.84.135 of the Kern County Zoning Ordinance.

MM 4.1-4 Prior to issuance of a building, grading or implementation of an EPA permit to construct, a Project Boundary Signage Plan for the CCS Surface Land Area shall be submitted. The plan shall include the size and wording on signs that create virtual access to a map that shows the CCS Surface Land Area and notes the existence of a CO_2 storage area underground. The sign shall also include a phone

number and email. The plan shall include the spacing of the physical signage around the entire perimeter of the CCS Surface Land Area approved in the permit.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.1-4: Create a New Source of Substantial Light or Glare That Would Adversely Affect Day or Nighttime Views in the Area

Sources of light and glare may be short term or long term. Short-term lighting is most often associated with temporary activities occurring during nighttime hours, such as providing safety, security, or temporary visibility for construction, farming, processing, or similar intermittent or temporary activities. Short-term glare may occur from temporary facilities supporting construction or other activities, such as areas for storage of materials or equipment, construction staging areas, and vehicle parking areas. Long-term sources of light or glare are most often associated with providing safety, security, or visibility for established development and operations. Impacts resulting from introducing new sources of substantial light or glare into the landscape were assessed. Because of the high number of variables, light and glare are not measured quantitatively but, instead, are assessed qualitatively in this visual assessment.

Impacts on aesthetic resources due to construction, operation, or decommissioning would result from activities that create a new source of substantial light or glare that would adversely affect day or nighttime views in the vicinity of the activities. Introducing new sources of substantial light or glare where it may affect viewers with high-visual sensitivity (i.e., people with high interest and concern for the visual quality of the landscape and changes to it, such as residents from the vicinity of their homes or people engaging in recreation or leisure activities) is of particular concern. However, due to the County's interest in protecting views of the night sky, promoting energy conservation and a reduction in the generation of greenhouse gases by reducing excessive or unwanted outdoor lighting, and encouraging a less light-oriented nighttime environment, introducing new sources of substantial light and glare is of concern for all viewers during all phases of development.

Construction Impacts

Aesthetic impacts of introducing new sources of substantial light and glare may result from any of the various activities described for construction impacts under Impact 4.1-4, described above. Most construction activities would primarily occur during daytime hours. Construction activities that are likely to occur at night and require artificial illumination would include drilling activities, vehicle and equipment activities supporting drilling, and safety and security lighting for areas, such as construction yards, work areas, vehicle and equipment parking areas, and staging and laydown areas. The primary purposes of nighttime lighting would be to protect the safety of the construction workers and the security of equipment, materials, and vehicles. Once drilling operations for the Class VI wells begin, they typically run continuously, 24 hours a day, due to the complexity of drilling and the hazards associated with leaving a well unattended during the drilling process. The

length of time required for drilling, and thus the time that drilling operations would require nighttime lighting, would vary depending on the depth of the well being drilled. Drilling may require from less than 24 hours up to 60 days, depending on the depth of the formation.

Construction activities generally occur during daytime hours, and may generate glare from construction equipment, materials, and vehicles. Impacts from glare would be dependent upon the location of the sun and orientation of the construction equipment and vehicles relative to viewers. Substantial glare would primarily result from reflectance of sunlight off glass, polished metal surfaces, and smooth or light-colored finishes on construction vehicles, equipment, and materials.

Views of construction activities would include drilling rigs, grading activities, trailers, vehicles, laydown areas, and other work areas that may introduce new sources of substantial light and glare that would adversely affect day or nighttime views in the vicinity of the activities. The greatest sources of glare during construction would be from light-colored vehicles and equipment, such as those visible in the vicinity of each of the drilling rigs in the views. The greatest sources of new lighting would be associated with drilling rigs and safety and security lighting for various facilities and would occur in the short term.

Throughout the project's construction, impacts to aesthetics and visual resources could result in potentially significant impacts; therefore, MM 4.1-5 would be required to reduce these potential impacts to a less than significant level.

Operational and Decommissioning Impacts

Aesthetic impacts of introducing new sources of substantial light and glare may result from any of the various activities and elements described for operation impacts under Impact 4.1-3, discussed above. Operational activities and elements that are likely to create new sources of substantial light that would adversely affect nighttime views in the area include nighttime safety and security lighting of facilities. Typically, injection units would not have nighttime lighting during operation except during brief periods of maintenance. Safety and security lighting reflecting off the surfaces of various facilities, tall light standards with exposed bulbs, or light sources that cast light widely or upward may be visible across a broad area. Where new lighted facilities are sited near other existing similarly lighted facilities of other structures, aesthetic impacts may be less severe than when they are located in areas with few existing light sources.

Operational activities and elements that are likely to create new sources of substantial glare that would adversely affect daytime views in the area include elements, such as pipes, pumping units, tanks, and other facilities with polished metal surfaces or smooth or light-colored finishes. Impacts from glare would primarily result from reflectance of sunlight off highly reflective surfaces and be dependent upon the location of the sun and orientation of the operation elements relative to viewers.

Pumping units, storage tanks, pipes, and other facilities, which may introduce new sources of substantial light or glare, would adversely affect day or nighttime views in the vicinity of the activities. The greatest sources of new light during operation would be associated with safety and security lighting for various facilities and the greatest sources of glare during operation would be from light-colored and polished metal finishes on pipes, tanks, and pumping units.

As explained in Impact 4.1-3, wells would undergo plugging and abandonment once storage capacity targets have been met. In decommissioning the site, similar levels of light and glare would occur on a temporary basis.

The extent of impacts to aesthetics and visual resources during project operations and decommissioning could result in potentially significant impacts; therefore, MM 4.1-5 would be required to reduce these potential impacts to a less than significant level.

Summary of Project Aesthetic and Visual Impacts

Visual impacts resulting from new sources of light or glare that would adversely affect day or nighttime views in the area due to construction, operation, or decommissioning of CCS facilities would be potentially significant. Light that is produced from the project site would be visible to a minimal number of off-site viewers because the roads leading into Elk Hills are closed to the public. The proposed project would likely introduce new lighting features during construction and operations, similar to those currently existing within the project site; however, the project would be required to conform to the Kern County Dark Skies Ordinance, which would require the minimum lighting possible for safety, as well as shielding of light fixtures and a downward orientation to eliminate light spillover. The following mitigation measures would be implemented to reduce the level of significance.

Mitigation Measures

MM 4.1.5 All new lighting, including permanent nighttime lighting, safety, security, and operational lightening, shall comply with the standards in Kern County Zoning Chapter 19.81 – Outdoor Lighting "Dark Sky Ordinance."

Level of Significance after Mitigation

Impacts would be less than significant.

4.1.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development, including wells and abandonment activity to implement CCS projects, constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development, in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance – 2015(c) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018, an SREIR certified on March 8, 2021, and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development

that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year countywide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection, and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate Bill [SB] 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the state of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to aesthetic and visual resources is considered the Elk Hills and surrounding viewshed. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on aesthetics and visual resources. This geographic scope of analysis is appropriate because the visual quality within this area is expected to be similar to that of the project site because of its proximity, similar environment and landform, and would result in similar land use.

Impact 4.1-5: Contribute to Cumulative Aesthetic Impacts

Regarding impacts to aesthetic and visual resources, the project has the potential to contribute to cumulative impacts within the region. A complete analysis and evidence for the record of the cumulative impacts on visual resources of the various ground-disturbing activities from oil and gas are provided 4.1, *Aesthetics* of the Oil and Gas EIR. No additional feasible mitigation measures exist to avoid or reduce significant adverse cumulative impacts to aesthetics (existing visual character) to a less than significant level. Even with the implementation of MM 4.1-1 through MM 4.1-4, impacts to visual resources would be significant and unavoidable with the additions of the injection wells, monitoring wells, and capture facilities equipment.

Mitigation Measures

Implement MM 4.1-1 through MM 4.1-4, as described above.

Level of Significance

Cumulative impacts would be significant and unavoidable.

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Section 4.2

Agricultural and Forest Resources

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Section 4.2

Agriculture and Forestry Resources

4.2.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for agriculture and forestry resources. This section also describes the impacts to agriculture and forestry resources that would result from implementation of California Resources Corporation's (project proponent) proposed Carbon TerraVault I (Kern County) Project (project). The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the city of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

The analysis of the proposed project's potential impacts on agriculture and forest resources was conducted based on a qualitative review and analysis of the Kern County Agricultural Crop Report, California Department of Conservation (DOC), Division of Land Resource Protection's Important Farmland Map, and Kern County's Williamson Act Map. In addition, the analysis of potential impacts are based on an analysis of the Kern County General Plan's (KCGP's) applicable goals and policies related to agricultural resources.

4.2.2 Environmental Setting

Regional Setting

Kern County is California's third largest county, encompassing 8,202 square miles at the southern end of the Central Valley. Kern County has a history of agricultural operations with approximately 1,373 square miles of harvested agricultural land and 2,317 square miles of range land. The 2022 total Agricultural Product Value produced in Kern County was $7,724,166,300 (Table 4.2-1), which is a decrease of 7.4 percent over the 2021 Agricultural Product Value (Kern County Department of Agriculture 2022). The top five commodities for 2022 were grapes, citrus, milk, almonds, and pistachios, which make up more than $4 billion, 52 percent, of the Total Agricultural Product Value (Kern County Department of Agriculture 2022).

Table 4.2-1: Agricultural Product Values for Kern County in 2022

Product	Total Value
Fruit and Nut Crops	$4,464,472,000
Field Crops & Rangeland	$397,032,000
Vegetable Crops	$1,141,127,000
Nursery Crops	$141,298,000

Table 4.2-1: Agricultural Product Values for Kern County in 2022

Product	Total Value
Industrial and Wood Crops	$34,854,000
Seed Crops	$8,428,300
Livestock and Poultry	$340,526,000
Livestock and Poultry Products	$1,092,651,000
Apiary Products	$103,779,000
TOTAL	$7,724,166,300

Source: Kern County Department of Agriculture 2022; USDA 2022

Despite the increase in Agricultural Product Value, Kern County's agricultural areas face an increase in pressure to convert productive farmland to housing, industrial, and commercial development. The total net loss of agricultural lands in the unincorporated area of the County during the period of 1998 to 2021 has been 36,476 acres (Kern County Planning and Natural Resources Department 2022a). Within the KCGP area, most of the agricultural lands that have been converted since 1998 have been used as solid waste buffer and continue to be farmed through leases to neighboring farmers.

The Kern Council of Governments (COG) projects that Kern County's population will grow from its 2020 Census population of 909,000 to more than 1,186,600 in 2046 (Kern COG 2022). This growth in population could lead to further increase the amount of agricultural land conversion to nonagricultural uses in Kern County.

Local Setting

The proposed project site is located within Elk Hills, which comprises an approximately 75-square-mile (47,800-acre) complex in the San Joaquin Valley of unincorporated Kern County. The project area is bounded by Kings and Tulare Counties to the north, Santa Barbara and San Luis Obispo Counties to the west, the Tehachapi Mountains and the Sierra Nevada Mountains to the east, and the northern boundary of the Los Padres National Forest to the south.

The project area is characterized by extensive oil and gas exploration and production, including existing well pads, processing facilities, pipeline routes, and access roads. Most of the proposed new pipeline infrastructure follows established pipeline routes. Development in the surrounding area is predominantly oil and gas production, agricultural, and municipalities, such as the towns of McKittrick, Tupman, Taft, and Buttonwillow. The project area boundaries encompass a mix of parcels that have been owned and used for oil and gas production or on which leases have been acquired by the project proponent.

Adopted General Plan Land Use and Zoning

As discussed in Chapter 3, *Project Description*, the project site is located in an area designated as "Extensive Agriculture" and "Minerals and Petroleum" land uses (see Chapter 3, Figure 3-3). These land use designations are present within and surrounding the project site, and are defined as follows:

- Extensive Agriculture - Agricultural uses involving large amounts of land with relatively low value-per-acre yields, such as livestock grazing, dry land farming, and woodlands. Minimum parcel size is 20 acres gross, except lands subject to a Williamson Act Contract/ Farmland Security Zone Act Contract, in which case the minimum parcel size shall be 80 acres gross. Uses shall include, but are not limited to, the following: livestock grazing; dry land farming; ranching facilities; wildlife and botanical preserves; timber harvesting; one single-family dwelling unit; irrigated croplands; water storage or groundwater recharge areas; mineral; aggregate; petroleum exploration and extraction; recreational activities, such as gun clubs and guest ranches; and land within development areas subject to significant physical constraints.
- Mineral and Petroleum - Areas that contain producing or potentially productive petroleum fields, natural gas, and geothermal resources, and mineral deposits of regional and statewide significance. Uses are limited to activities directly associated with the resource extraction. Minimum parcel size is 5 acres gross. Uses shall include, but are not limited to, the following: mineral and petroleum exploration and extraction, including aggregate extraction; extensive and intensive agriculture; mineral and petroleum processing, excluding petroleum refining; natural gas and geothermal resources; pipelines; power transmission facilities; communication facilities; equipment storage yards; and borrow pits.

The project site is zoned as Exclusive Agriculture (A) and Limited Agriculture (A-1) (see Chapter 3, *Project Description*, Figure 3-2). Per the KCGP, the Exclusive Agriculture (A) district permits single-family homes with only one unit per 20 acres, farm labor housing for on-site employees, mobile homes, residential facilities serving six or fewer persons, housing for contract farm labor (up to 12 people), and secondary residential units by right. Conditional use permits (CUPs) are required for farm labor housing for contract labor, community care facilities, and additional dwelling units at one dwelling unit per 20 acres. The Limited Agriculture (A-1) zoning district permits manufactured homes and mobile homes, secondary residential units, accessory units, residential facilities serving six or fewer persons, and single-family dwellings. Additional single-family dwellings on a minimum of 2.5 acres, community care facilities, farm labor housing, and manufactured or mobile homes wider than 16 feet are conditionally permitted. Limited opportunities for housing, including farm labor housing and logging camps, are also provided in the Recreation-Forestry, Natural Resources, and Floodplain Primary zoning districts.

Important Farmland and William Act Contracts

The project site is not designated by the California DOC as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland (see Figure 4.2-1). The project site is designated Vacant or Disturbed Land, Nonagricultural and Natural Vegetation, Grazing, and Urban and Built-Up Land. A portion of the project site is land designated as Non-Prime Farmland; however, it is zoned as

Exclusive Agriculture (A) and is included in an agricultural preserve as required by Kern County policies (see Figure 4.2-2). Additionally, a portion of land immediately southwest of the project, but outside the CUP boundary, is identified as being subject to an active Williamson Act land use contract.

Review of the U.S. Department of Agriculture – Forest Service map indicates there are no forests within or in close proximity to the project site.

4.2.3 Regulatory Setting

Federal

Farmland Protection Policy Act (7 United States Code 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. The FPPA 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.

The FPPA is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It ensures that, to the extent possible, federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. Federal agencies are required to develop and review their policies and procedures to implement the FPPA every two 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 owners.

For the purpose of the FPPA, Farmland includes Prime Farmland, Unique Farmland, and Farmland 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 water or urban 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.

Figure 4-2.1: California Important Farmland

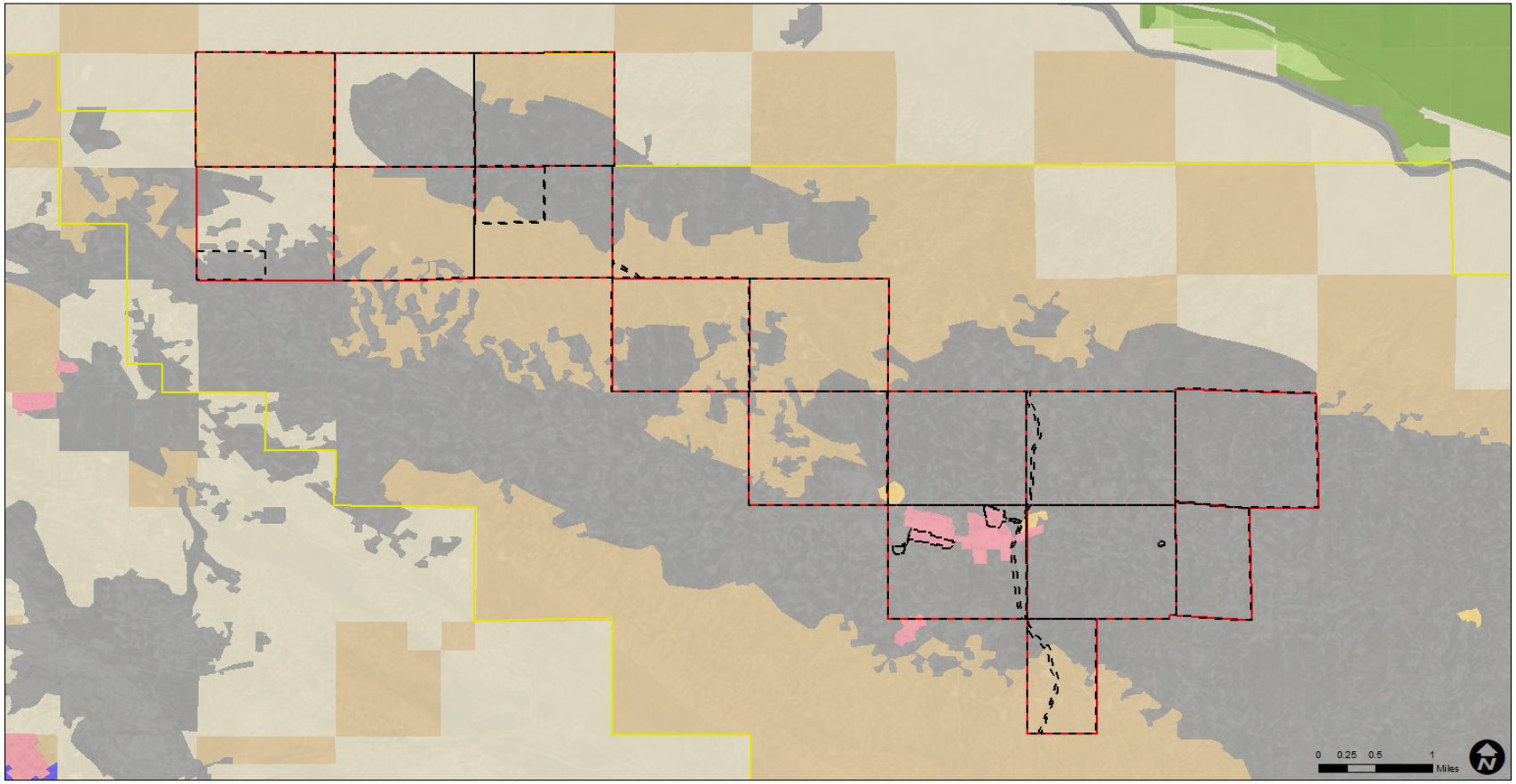

FIGURE 4.2-1: California Important Farmland

Draft Environmental Impact Report
Carbon TerraVault I Project

Figure 4.2-2: Williamson Act Land Use Contracts

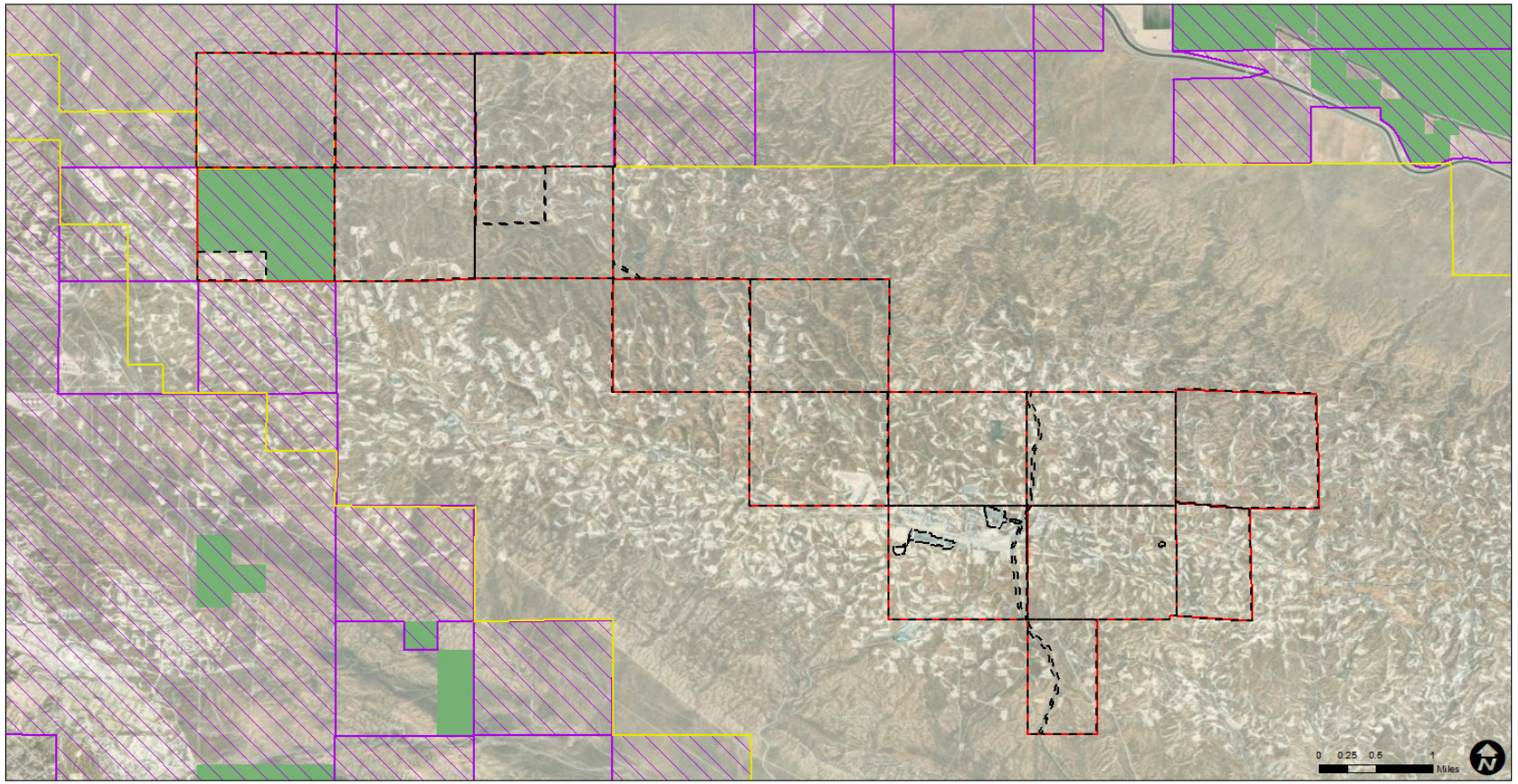

FIGURE 4.2-2: Williamson Act Land Use Contracts

Draft Environmental Impact Report
Carbon TerraVault I Project

State

California Department of Conservation, Division of Land Resource Protection

The California DOC applies the Natural Resources Conservation Service (NRCS) soil classifications to identify agricultural lands, and these agricultural designations are used in planning for the present and future of California's agricultural land resources. The DOC has a minimum mapping unit of 10 acres, with parcels that are smaller than 10 acres being absorbed into the surrounding classifications.

The list below provides a comprehensive description of all the categories mapped by the DOC (DOC 2022). Collectively, lands classified as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland are referred to as Farmland (DOC 2004).

- **Prime Farmland (P):** Irrigated land with the best combination of physical and chemical features able to sustain long-term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been irrigated for production of irrigated crops at some time during the four years prior to the mapping date.
- **Farmland of Statewide Importance (S):** Irrigated land similar to prime Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops. This land has minor shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been irrigated for production of irrigated crops at some time during the four years prior to the mapping date.
- **Unique Farmland (U):** 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 cropped at some time during the four years prior to the mapping date.
- **Farmland of Local Importance (L):** Although counties may choose to define Farmland of Local Importance within their jurisdictions, the Board of Supervisors has determined that there will be no Farmland of Local Importance for Kern County.
- **Grazing Land (G):** Land on which the existing vegetation is suited to the grazing of livestock. This category is used only in California and was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.
- **Urban and Built-up Land (D):** 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 (X):** 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 waterbodies 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.

The Rural Land Mapping Project provides more detail on the distribution of various land uses within the other land category in eight Farmland Mapping and Monitoring Program counties, encompassing all the San Joaquin Valley counties. The rural land categories include:

- Rural Residential Land (R): Residential areas of one to five structures per 10 acres (ranchettes).
- Semi-agricultural and Rural Commercial Land (SAC): Farmsteads, agricultural storage and packing sheds, unpaved parking areas, composting facilities, equine facilities, firewood lots, and campgrounds.
- Vacant or Disturbed Land (V): Open field areas that do not qualify as an agricultural category, mineral and oil extraction areas, offroad vehicle areas, electrical substations, channelized canals, and rural freeway interchanges.
- Confined Animal Agriculture (Cl): Poultry facilities, feedlots, diary facilities, fish farms; this use may be a component of farmland of local importance in some counties.
- Nonagricultural or Natural Vegetation (nv): Heavily wooded, rocky/barren areas, riparian and wetland areas, grassland areas that do not qualify as grazing land due to their size of land management restrictions, small waterbodies, and recreational water ski lakes. Constructed wetlands are also included in this category.

- **Water (W):** Perennial waterbodies with an extent of at least 40 acres.

California Land Conservation Act (Williamson Act)

The Williamson Act is promulgated in California Government Code Section 51200-51297.4 and, therefore, applies only to specific land parcels within the state of California. The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or compatible uses in return for reduced property tax assessments. Private land within locally designated agricultural preserve areas is eligible for enrollment under Williamson Act contracts. The Williamson Act program is administered by the DOC, in conjunction with local governments, which administer the individual contract arrangements with landowners. The landowner commits the parcel to a 10-year period wherein no conversion out of agricultural use is permitted. Each year the contract automatically renews unless a notice of non-renewal or cancellation is filed. In return, the land is taxed at a rate based on the actual use of the land for agricultural purposes, as opposed to its unrestricted market value. An application for immediate cancellation can also be requested by the landowner, provided that the proposed immediate cancellation application is consistent with the cancellation criteria stated in the California Land Conservation Act and those adopted by the affected county or city. Non-renewal or immediate cancellation does not change the zoning of the property. Participation in the

Williamson Act program is dependent on county adoption and implementation of the program and is voluntary for landowners.

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 (California Code 2014).

California Government Code Section 51238 states that boards of supervisors may impose conditions on lands or land uses to be placed within preserves to permit and encourage compatible uses in conformity with Section 51238.1. The Kern County Agricultural Preserve Standard Uniform Rules specify that oil and gas drilling and production in accordance with the provisions of Chapter 19.98 of the Ordinance Code of Kern County are compatible uses in agricultural preserves.

Further, California Government Code Section 51238.1 allows a board or council to allow as compatible any use that without conditions or mitigations would otherwise be considered incompatible. However, this may occur only if that use meets the following conditions:

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

A board or council may approve uses on non-prime land, which, because of off-site or on-site impacts, would not comply with the first two criteria, provided that the use is approved pursuant to a CUP that sets forth findings required by California Government Code Section 51238.1(c).

Kern County has an active Williamson Act Land Use Contract Program. The 2022 subvention report filed with the State of California shows 1,478,857.9 acres under Williamson Act Contract for 10-year contracts that require qualifying uses be maintained (Kern County Planning and Natural Resources Department 2022b). There are no active Williamson Act Contract land within the CUP boundary for the carbon capture and storage (CCS) Surface Land Area.

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 Act status by entering into a contract with the County. Farmland Security Zone Act 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 active Farmland Security Zone Act Contract Program. The 2022 subvention report filed with the State of California shows 177,377.9 acres under Farmland Security Zone Act Contracts for 20-year contracts that require qualifying uses be maintained (Kern County Planning and Natural Resources Department 2022b). There are no active Farmland Security Zone Act Contracts within the CUP boundary for the CCS Surface Land Area.

Local

Kern County General Plan

The project site is located within the KCGP area; therefore, the project would be subject to applicable policies and measures of the KCGP. The KCGP states that agriculture is vital to the future of Kern County and sets the goals of protecting important agricultural lands for future use and preventing the conversion of prime agricultural lands to other uses (e.g., industrial or residential).

The policies, goals, and implementation measures in the KCGP for Agriculture and Forest Resources applicable to the project are provided below. The KCGP contains additional policies, goals, and implementation measures that are more general in nature and not specific to development such as the project. Therefore, they are not listed below, but as stated in Chapter 2, *Introduction*, all policies, goals, and implementation measures in the KCGP are incorporated by reference.

Chapter 1. Land Use, Conservation, and Open Space Element

1.9 – Resource

Goals

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 3. Ensure the development of resource areas minimize effects on neighboring resource lands.

Policies

Policy 1. Appropriate resource uses of all types will be encouraged as desirable and consistent interim uses in undeveloped portions of the County regardless of General Plan designation.

Policy 2. In areas with a resource designation on the General Plan map, only industrial activities which directly and obviously relate to the exploration, production, and transportation of the particular resource will be considered to be consistent with the General Plan.

Policy 5. Areas of low intensity agriculture use (Map Code 8.2 (Resource Reserve), Map Code 8.3 (Extensive Agriculture), Map Code 8.5 (Resource Management)) should be of an economically viable size in order to participate in the State Williamson Act Program/Farmland Security Zone Contract.

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 11. Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.

Policy 12. Areas identified by the NRCS (formerly Soil Conservation Service) as having high range-site value should be conserved for Extensive Agriculture uses or as Resource Reserve, if located within a County water district.

Policy 15. Agriculture and other resource uses will be considered a consistent use in areas designated for Mineral and Petroleum Resource uses on the General Plan.

Policy 21. The County shall encourage qualifying agricultural lands to participate in the Williamson Act program or Farmland Security Zone program.

Implementation Measures

Implementation Measure F. Prime agricultural lands, according to the Kern County Interim-Important Farmland 2000 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.

Implementation Measure G. Property placed under the Williamson Act/Farmland Security Zone Contract must be in a Resource designation.

Kern County Zoning Ordinance

The Kern County Zoning Ordinance establishes basic regulations under which land is developed. This includes allowable uses, building setback requirements, and development standards. Pursuant

to state law, the zoning ordinance must be consistent with the KCGP. The basic intent of the Kern County Zoning Ordinance is to promote and protect the public health, safety, and welfare via the orderly regulation of the land uses throughout the unincorporated area of the County. The zoning ordinance applies to all property in unincorporated Kern County, except land owned by the United States or any of its agencies. As previously mentioned in Chapter 3, *Project Description*, and as described in Section 4.2.2, *Environmental Setting*, the Kern County Zoning Ordinance designates the project site for agricultural or estate residential uses, and has combining districts of floodplain, residential suburban, and/or geologic hazard.

Williamson Act Standard Uniform Rules

Kern County has adopted a set of Agricultural Preserve Standard Uniform Rules that identify land uses that are considered compatible uses within agricultural preserves established under the Williamson Act. These rules are designed to restrict the uses of land enrolled in a Williamson Act contract to agriculture or other compatible uses. The Agricultural Preserve Standard Uniform Rules identify five classes of agricultural uses, including crop cultivation, grazing operations, commercial wind farms, livestock breeding, dairies, and uses that are incidental to agricultural uses allowed within the Agricultural Preserves. The rules also include 19 classes of compatible uses that include, but are not limited to, oil and gas drilling and production in accordance with Chapter 19.98 of the Ordinance Code of Kern County, as well as the erection of gas, electric, communications, water, and other similar public utilities.

4.2.4 Impacts and Mitigation Measures

Methodology

The analysis of the proposed project's potential impacts on agriculture and forest resources was conducted based on a qualitative review and analysis of the Kern County Agricultural Crop Report, California DOC Division of Land Resource Protection's Important Farmland Map, and Kern County's Williamson Act Map. In addition, the analysis of potential impacts are based on an analysis of the KCGP's applicable goals and policies related to agricultural resources.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist state that a project would have a significant impact on agricultural and forestry resources if it would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use;
- Conflict with existing zoning for agricultural use or a Williamson Act contract;
- Conflict with existing zoning for, or cause rezoning of, forest land or timberland;
- Result in the loss of forest land or conversion of forest land to non-forest use;

- Involve other changes in the existing environment which, because of their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use; and
- Result in the cancellation to an open space contract made pursuant to the California Land Conservation Act of 1965 or Farmland Security Zone Contract for any parcel of 100 or more acres.

Project Impacts

Impact 4.2-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to Nonagricultural Use

As previously mentioned, and depicted in Figure 4.2-1, the project site is not within areas of the Farmland. The project is located in areas classified as vacant or disturbed land, nonagricultural or natural vegetation, urban and built-up land, and semi-agricultural and rural commercial land.

Although the project would require approval of a zone change case from A-1 (Limited Agriculture) to A (Exclusive Agriculture), this rezoning would allow for more types of agricultural uses 'by-right' within the project area thereby increasing opportunities for viable agricultural crop and grazing land. The A-1 (Limited Agriculture) zoning is intended for a combination of rural residential (2.5 acres minimum lot size) and commercial agriculture. CCS activities are not compatible with the A-1 residential use; therefore, a rezoning of the land is required for project implementation. If the project area is leased for agricultural or farming purposes during project implementation, the proposed project activities could result in potentially significant impacts with compatibility for the CCS Surface Land Area over the carbon dioxide (CO_2) storage areas and near the injection well sites. Therefore, Mitigation Measure (MM) 4.2-1 would be required to reduce these potential impacts to a less than significant level.

Mitigation Measures

MM 4.2.-1 Prior to any use of any portion of the CCS Surface Land Area for agricultural cultivation, the CCS owner/operator shall provide the following for review and approval to the Planning and Natural Resources Department:

A. A site plan showing the location of the agricultural operations within the CCS Surface Land Area that includes a written signed statement from the CCS owner/operator of the following requirements:

1. No activities are being authorized for the agricultural lease that would involve drilling of any water wells or other exploratory activities that would penetrate the confined cap layer to cause a leak.
2. No use of the buffer area around the injection well sites is included in any agricultural cultivation or related operations.

3. Acknowledgement that the farming operation has been informed and has a binding agreement to not conduct any activities near or in proximity to either the injection well sites or the capture facilities that would damage the fencing or equipment and a Worker Awareness Program for the farming employees of the use of the underground for CO_2 storage.
4. That any lease for agricultural cultivation is bound by all applicable requirements of the project CUP and EIR Mitigation Monitoring and Reporting Plan.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.2-2: Conflict with Existing Agricultural Zoning or Williamson Act Contracts

The project proponent is seeking approval of a zone change from A-1 (Limited Agriculture) to A (Exclusive Agriculture). Therefore, the project site could continue to be used for compatible agricultural uses. Furthermore, at the end of the project lifespan (currently estimated to be 30 years), project infrastructure could be removed and the land disturbed by the project could be restored to conditions suitable for agricultural uses. Implementation of the project would not be in conflict with existing agricultural zoning classifications.

A portion of the proposed project is included in the Kern County Agricultural Preserve No. 3 as zoned A (Exclusive Agriculture) (see Figure 4.2-2). The nearest parcel that is subject to a Williamson Act Land Use Contract is approximately 0.6 miles southwest from the proposed CUP boundary. Although the project site is in an agricultural preserve, Kern County has adopted a set of Agricultural Preserve Standard Uniform Rules that identify land uses that are considered compatible uses within agricultural preserves established under the Williamson Act. The rules includes 19 classes of compatible uses that include, but are not limited to, oil and gas drilling and production in accordance with Chapter 19.98 of the Ordinance Code of Kern County, as well as the erection of gas, electric, communications, water, and other similar public utilities. As none of the CUP boundary has any Williamson Act or Farmland Security Zone Act Contracts within the CUP boundary, the Agricultural Uniform Rules do not apply. Therefore, impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.2-3: Conflict with Existing Zoning for, or Cause Rezoning of, Forest Land or Timberland

As previously mentioned, the project site is currently designated as A (Exclusive Agriculture) and A-1 (Limited Agriculture). The project proponent is seeking approval of a zone change from A-1 (Limited Agriculture) to A (Exclusive Agriculture). Although, timber production is allowed on lands zoned A (Exclusive Agriculture), the properties within the project area do not support timberland, forest land, or production of timber. In addition, the project proponent would obtain CUPs under Kern County Zoning Ordinance, Section 19.08.085, and Section 19.06.020 to allow for the construction and operation of carbon capture sites, Class VI UIC injection wells, and accessory infrastructure. Therefore, the project would be consistent with Kern County Zoning Ordinance regulations for storage operation. The project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland, nor would it conflict with timber production. Therefore, no impact would occur.

Mitigation Measures

No mitigation measures are required.

Level of Significance

No impact would occur.

Impact 4.2-4: Result in the Loss of Forest Land or Conversion of Forest Land to Non-forest Use

As described in Section 4.2.2, *Environmental Setting*, the project site is entirely within Elk Hills. The project area is characterized by heavy oil and gas exploration and production, including existing well pads, processing facilities, pipeline routes, and access roads. Most of the proposed new pipeline infrastructure follows established pipeline routes. Development in the surrounding area is predominantly oil and gas production, agricultural, and municipalities, such as the towns of McKittrick, Tupman, Taft, and Buttonwillow. The project area boundaries encompass a mix of parcels that have been owned and used for oil and gas production or on which leases have been acquired by the project proponent. Due to a lack of forest land on the site, the project would not result a loss of forest land or conversion of forest land to non-forest use. Therefore, no impacts would occur.

Mitigation Measures

No mitigation measures are required.

Level of Significance

No impact would occur.

Impact 4.2-5: Involve Other Changes in the Existing Environment, Which, Because of Their Location or Nature, Could Result in Conversion of Farmland to Nonagricultural Use or Conversion of Forest Land to Non-Forest Use

As previously mentioned, the project site is not within an area used for or support farmland or forest land. The project site is primarily made up of vacant or disturbed land, or nonagricultural or natural vegetation. In addition, once storage capacity targets have been met, wells and associated infrastructure would be decommissioned. Therefore, project implementation would not result in permanent changes to the environment that, due to location or nature, would result in conversion of farmland or forest land to nonagricultural use of non-forest use. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.2-6: Result in the Cancellation of an Open Space Contract Made Pursuant to the California Land Conservation Act of 1965 or Farmland Security Zone Act Contract for Any Parcel of 100 or More Acres

As previously noted, no portion of the project site is subject to an open space contract made pursuant to the California Land Conservation Act of 1965 or Farmland Security Zone Act Contract. The nearest parcel that is subject to a Williamson Act Land Use Contract is approximately 0.6 miles southwest from the proposed project features. Therefore, the project would not result in cancellation of any Williamson Act contract, and no impact would occur.

Mitigation Measures

No mitigation measures are required.

Level of Significance

No impact would occur.

4.2.5 Cumulative Setting Impacts and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development, including wells and abandonment activity to implement CCS projects, constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously

proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year countywide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection, and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate Bill [SB] 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to agriculture resources is considered the entire County. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on agriculture resources. This geographic scope of analysis is appropriate because the agriculture, farming, and forestry resources within this area are expected to be similar to those in the project site because of their proximity; similar environments, landforms, and hydrology would result in similar land use and, thus, site types.

Regarding impacts to significant agriculture and forest resources, the project has the potential to contribute significantly to cumulative impacts within the region. A complete analysis and evidence for the records of the cumulative impacts of the various ground disturbing activities from oil and gas are provided in Chapter 4.2, *Agricultural and Forestry Resources*, of the Oil and Gas EIR.

Population growth is expected to continue in the County, and conversion of agricultural land to nonagricultural use can be expected from the need for additional residential development and infrastructure to accommodate the growth in the County.

The 2022 Kern COG Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) forecasts the addition of 304,300 people and the conversion of 13 square miles between 2018

and 2046 (Kern COG 2022). Implementation of the Kern COG RTP/SCS (Kern COG 2022) would continue to reduce the rate of Farmland conversion due to policies to concentrate new development in existing urban areas and mitigate for potential impacts. Nonetheless, due to the importance of the region's agricultural resources, the potential impacts related to the project's incremental contribution to the cumulative farmland conversion would be considered cumulatively considerable.

Because there are other factors, such as commodity pricing in the global market and water pricing and availability that influence the feasibility of ongoing agricultural operations in Kern County, there may be a cumulative significant loss in agricultural resources in Kern County for reasons that are outside the jurisdiction and control of the County. The 2004 KCGP also forecasts a net loss of 80,854 acres of prime and important farmland and 55,000 acres of grazing lands in Kern County based on land use conversions consistent on existing land use plans, which would further reduce Kern County's agricultural lands. The 2022 KCGP/Housing Element Annual Report shows that 30,794 acres of farmland have been lost since the 2004 projection. As the use of the land for a CCS storage facility restricts approximately 9,104 acres of land for agricultural industries, if remediated from oil and gas use and may discourage the use of the land for crops or orchards, the loss of agricultural land is significant and unavoidable. As there is no other CCS project in operation in California for evidence of the use of the surface for agricultural industries, such as crop processing or cold storage, or even the growing and harvesting of crops, all feasible and reasonable mitigation measures have been imposed. Based on the countywide loss of agricultural land due to the Groundwater Sustainability Act, reduction in water for agricultural use, drought conditions, and urban growth patterns, the loss is considered significant and unavoidable.

Mitigation Measures

The project would be required to implement MM 4.2-1, as described above.

Level of Significance

Impacts would be significant and unavoidable.

Section 4.3

Air Quality

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Section 4.3
Air Quality

4.3.1 Introduction

This section describes the affected environment and regulatory setting for Air Quality. It also describes the impacts on Air Quality that would result from implementation of California Resources Corporation's (project proponent) proposed Carbon TerraVault 1 (Kern County) Project (project). The project site is a specific set of parcels within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself (see Chapter 3, *Project Description*). Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the city of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance. *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated Environmental Impact Report (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.A description of the environmental setting (affected environment) for Air Quality is presented below in Section 4.3.2, *Environmental Setting*. The regulatory setting applicable to Air Quality related impacts is presented in Section 4.3.3, *Regulatory Setting*, and Section 4.3.4, *Impacts and Mitigation Measures,* discusses project impacts and associated mitigation measures.

4.3.2 Environmental Setting

The project is in the larger San Joaquin Valley Air Basin (SJVAB), which encompasses 3,700 square miles and generally includes most of the San Joaquin Valley (SJV) floor or western portion of the county. The SJV floor is within the southern end of the SJVAB, which is made up of all or portions of eight counties in California's Central Valley. These counties include Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties, as well as the SJV portion of Kern

County. The western portion of Kern County, where the project is located is regulated by the San Joaquin Valley Air Pollution Control District (SJVAPCD).

Air pollution in the SJVAB can be attributed to both human-related (anthropogenic) and natural (non-anthropogenic) activities that produce emissions. Air pollution from significant anthropogenic activities in the SJVAB includes a variety of industrial-based sources as well as on- and off-road mobile sources. Activities that tend to increase mobile activity include increases in population, increases in traffic (including automobiles, trucks, aircraft, and rail), urban sprawl (which increases commuter driving distances), and general local land management practices as they pertain to modes of commuter transportation (SJVAPCD 2015). Air pollution is also transported into the SJVAB from a variety of sources, including Northern California and Asia (Faloona et al. 2015).

Meteorological Conditions

The SJVAB is the southern half of California's Central Valley and is 250 miles long and bordered by mountains on three sides. The SJV is bordered by the Sierra Nevada to the east (8,000 to 14,491 feet in elevation), the Coast Ranges to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 7,981 feet in elevation). There is a slight downward elevation gradient from Bakersfield in the southeast end (elevation 408 feet) to sea level at the northwest end where the valley opens to the San Francisco Bay at the Carquinez Straits. At its northern end is the Sacramento Valley, which comprises the northern half of California's Central Valley. The bowl-shaped topography inhibits movement of pollutants out of the valley.

The overall climate in the SJVAB is warm and semi-arid. The SJV is in a Mediterranean Climate Zone. Mediterranean Climate Zones occur on the West Coast of continents at 30 to 40 degrees latitude and are influenced by a subtropical high-pressure area most of the year. Mediterranean climates are characterized by sparse rainfall, which occurs mainly in the winter. There is only one wet season during the year and 90 percent of the precipitation falls during October through April. Snow in the SJV is infrequent and thunderstorms seldom occur. Summers are hot and dry. Summertime maximum temperatures often exceed 100 degrees Fahrenheit (°F) in the SJV.

The subtropical high-pressure area is strongest during spring, summer, and fall and produces subsiding air, which can result in temperature inversions in the valley. Air temperature in the lowest layer of the atmosphere typically decreases with altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. The height of the base of the inversion is known as the "mixing height." This is the level to which pollutants can mix vertically. Mixing of air is minimized above the inversion base. The inversion base represents an abrupt density change where little air movement occurs. A temperature inversion can act like a lid, inhibiting vertical mixing of the air mass near the land surface, resulting in trapping of air pollutants below the inversion. Most of the surrounding mountains are above the normal height of summer inversions (1,500 to 3,000 feet). Concentration levels of air pollutants are directly related to inversion layers due to the limitation of vertical mixing. Inversion layers enhance the formation of ozone (O_3) and limit dispersion of directly emitted pollutants like particulate matter (PM) and carbon monoxide (CO) (SJVAPCD 2015).

Winter-time high-pressure events can often last many weeks with surface temperature often lowering into the 30°F range. During these events, fog can be present, and inversions are extremely strong. These winter-time inversions can inhibit vertical mixing of pollutants to a few hundred feet (SJVAPCD 2015).

The transport and dispersion of air pollutants in ambient air are influenced by many complex factors. The primary factors are wind, topological boundaries, and atmospheric stability. During the summer, wind speed and direction data indicate that summer wind usually originates at the north end of the SJV and flows in a south-southeasterly direction through the valley and the Tehachapi Pass, into the Mojave Desert. During the winter months, the SJV experiences light, variable winds, less than 10 miles per hour.

Topography

Air pollution is directly related to a region's topographic features. The SJVAB is approximately 250 miles long, an average of 35 miles wide, and is the second largest air basin in the state. The SJVAB is defined by the Sierra Nevada in the east (8,000 to 14,000 feet in elevation), the Coast Ranges in the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains in the south (6,000 to 8,000 feet in elevation). The valley is basically flat with a slight downward gradient to the northwest and opens to the sea at the Carquinez Strait where the San Joaquin-Sacramento Delta empties into San Francisco Bay.

Wind Patterns

The SJVAB's topography has a dominating effect on wind patterns. Winds tend to blow somewhat parallel to the valley and mountain range orientation. In spring and early summer, thermal low-pressure systems develop over the interior basins east of the Sierra Nevada, and the Pacific High (high-pressure system that develops over the central Pacific Ocean near the Hawaiian Islands) moves northward. These developments and the topography produce the high incidence of relatively strong northwesterly winds in the spring and early summer (SJVAPCD 2015).

Wind speed and direction data indicate that during the summer, winds usually originate at the north end of the SJVAB and flow in a south-southeasterly direction through the Tehachapi Pass into the Southeast Desert Air Basin. Wind speed and direction data indicate that during the winter, winds occasionally originate from the south end of the SJVAB and flow in a north-northwesterly direction. Also, during winter, the SJVAB experiences light, variable winds, typically less than 10 mph. Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high CO and inhalable particulates concentrations (SJVAPCD 2015).

For the southernmost portion of the SJVAB, steady winds are typical in the mountainous area that characterizes this portion, and quickly disperse air pollutants.

Temperature

The vertical rise and mixing of air pollutants is limited by the presence of persistent temperature inversions. Inversions may be either ground level or elevated. Ground-level inversions occur frequently during early fall and winter (i.e., October through January). High concentrations of primary pollutants, which are those emitted directly into the atmosphere (e.g., CO), may be found at these times. Elevated inversions act as a lid over the basin and limit vertical mixing, resulting in severe air stagnation. Elevated inversions contribute to the occurrence of high levels of O_3 during the summer months.

In winter, storm systems moving in from the Pacific Ocean bring a maritime influence to the SJV. The Sierra Nevada prevents the cold, continental air masses from influencing the valley. Temperatures below freezing are unusual. Historical data from the Buttonwillow monitoring station indicate average lows in the 30s during winter and average lows in the 60s in the summer. Average highs in the winter in the 50s, and average highs in the summer are in the 90s (WRCC 2023a).

Precipitation

Precipitation in the SJVAB is strongly influenced by the position of the semi-permanent subtropical high-pressure area located off the Pacific coast (the Pacific High). In the winter, this high-pressure system moves southward, allowing Pacific storms to move through the SJVAB. The majority of the precipitation in the valley is winter rain produced by these storms. Snowstorms, hailstorms, and ice storms occur infrequently in the valley, and severe occurrences are very rare.

Precipitation in the SJVAB is typically less than 8 inches per year. The SJV is an area of variable relative humidity. During the warm season, humidities are characteristically low and occasionally, under the influence of the "norther,", readings may drop to below 10 percent. In the delta area, at the confluence of the Sacramento and San Joaquin Rivers, a strong inflow of marine air during the summer creates a transition zone between the high humidities of the coast and the low readings of the interior. Winter values are usually moderate to high. A shallow layer of ground fog, known locally as "tule fog," frequently forms at night and can persist for as long as two or three weeks (WRCC 2023b).

Existing Air Quality

The U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) have established health-based ambient air quality standards for several different pollutants. The EPA sets National Ambient Air Quality Standards (NAAQS) for the following seven pollutants for ozone, CO, nitrogen dioxide (NO_2), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2) and lead (Pb). These seven pollutants are commonly referred to as "criteria pollutants." Primary standards provide public health protection, including protecting the health of "sensitive" populations, such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

In addition, CARB has established California Ambient Air Quality Standards (CAAQS) standards for these pollutants, as well as for sulfate (SO_4^{2-}), visibility reducing particles, hydrogen sulfide (H_2S), and vinyl chloride. California standards are generally stricter than national standards. The NAAQS and the CAAQS are shown in Table 4.3-1.

On May 2014, the SJVAPCD formally requested that the EPA determine that the SJV has attained the federal 1-hour ozone standard based on the fact that the SJV has been meeting the 1-hour ozone standard based on the "expected exceedance days" test over the 2011 to 2013 three-year period air monitoring data.

Since 1992, the SJVAPCD air quality management strategies have focused on the 1-hour ozone standard, trying to achieve the emissions reductions needed to demonstrate attainment by developing and implementing attainment plans, adopting over 500 stringent rules related to emissions reductions, and supplementing its regulatory programs with a voluntary incentive program.

Ambient Air Quality

The SJVAPCD, CARB, National Park Service, and Santa Rosa Rancheria in Lemoore operate an extensive network of air monitoring stations in the SJV. The monitoring station network provides air quality monitoring data, including real-time meteorological data and ambient pollutant levels, as well as historical data. The network in the SJVAB consists of 37 monitoring stations, eleven of which are located in western Kern County within the project area (SJVAPCD 2022). Table 4.3-3 presents the measured ambient pollutant concentrations and the exceedances of state and federal standards that have occurred at the above-mentioned monitoring stations from 2019 through 2021.

Criteria Air Pollutants and Health Effects

The following is a general description of the criteria air pollutants that are hazardous to human health and are regulated by federal and state ambient air quality standards or criteria for outdoor concentrations.

Ozone (O_3)

In the presence of ultraviolet radiation, nitrogen oxides (NO_X) and volatile organic compounds (VOCs)/reactive organic gases (ROG) go through a number of complex chemical reactions to form ozone. Table 4.3-3 includes the maximum hourly concentration and the number of days above the federal and State standards. As shown in Table 4.3-3, ozone continues to be above the State 1-hour and both the federal and State 8-hour ozone standards in many places in Kern County. The SJVAPCD attainment status for ozone is currently severe nonattainment for State 1-hour ozone; nonattainment/extreme for the federal 8-hour ozone; and nonattainment for State 8-hour ozone.

Table 4.3-1: National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[b, e]	National Standards[a, e]	
			Primary[c]	Secondary[d]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	---[f]	---
	8-Hour	0.070 ppm (137 µg/m^3)	0.070 ppm (147 µg/m^3)	Same as Primary Standard
Carbon monoxide (CO)	1-Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	---
	8-Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	---
Nitrogen dioxide (NO_2)	1-Hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	---
	Annual Mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary Standard
Sulfur dioxide (SO_2)[g]	1-Hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	---
	3-Hour	---	---	0.5 ppm (1,300 µg/m^3)
	24-Hour	0.04 ppm (105 µg/m^3)	---	---
Respirable Particulate Matter (PM_{10})[h]	24-Hour	50 µg/m^3	150 µg/m^3	Same as Primary Standard
	Annual Mean	20 µg/m^3	---	---
Fine Particulate Matter ($PM_{2.5}$)[h]	24-Hour	---	35 µg/m^3	Same as Primary Standard
	Annual Mean	12 µg/m^3	12.0 µg/m^3	15 µg/m^3
Lead (Pb)	30-day Average	1.5 µg/m^3		
	Rolling 3-month Average		0.15 µg/m^3	Same as Primary Standard

Table 4.3-1: National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[b, e]	National Standards[a, e]	
			Primary[c]	Secondary[d]
Hydrogen sulfide (H_2S)	1-Hour	0.03 ppm (42 µg/m^3)	No Federal Standards	
Sulfate (SO_4^{2-})	24-Hour	25 µg/m^3		
Visibility reducing particles	8-Hour	See Note i		
Vinyl chloride[j]	24-Hour	0.01 ppm (26 µg/m^3)		

Sources: CARB 2016; EPA 2023a;

Notes:

[a] National Ambient Air Quality Standards (other than ozone, particulate matter, and those based on annual averages or 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 in a year, averaged over three years, is equal to or less than the standard. For particulate matter less than 10 microns (PM_{10}), the 24-hour standard is not to be exceeded more than once per year on average over three years. The 24-hour standard is attained when the three-year average of the weighted annual mean at each monitor within an area does not exceed 150 µg/m^3. For particulate matter less than 2.5 microns ($PM_{2.5}$), the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, do not exceed 35 µg/m^3. The annual standard is attained when the three-year average of the weighted annual mean at single or multiple community-oriented monitors does not exceed 12 µg/m^3.

[b] California Ambient Air Quality Standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (SO_2; 1- and 24-hour), nitrogen dioxide (NO_2), PM_{10} and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded.

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

[d] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse impacts of a pollutan

[e] Concentration expressed first in units in which it was promulgated. Parts per million (ppm) in this table refers to ppm by volume or micromoles of pollutant per mole of gas.

[f] The federal 1-hour ozone standard was revoked for most areas of the United States, including all of California on June 15, 2005.

[g] Final rule signed June 2, 2010. The 1971 annual and 24-hour SO_2 standards were revoked in that same rulemaking.

[h] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12 µg/m^3. Existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^{3}also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over three years.

[i] In 1989, the California Air Resources Board 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.

[j] The California Air Resources Board has identified lead and vinyl chloride as “toxic air contaminants” with no threshold level of exposure for adverse health impacts determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Key:

ppb = parts per billion

ppm = parts per million

µg/m^3 = micrograms per cubic meter

mg/m^3 = milligrams per cubic meter

Table 4.3-2 summarizes the federal and state attainment status for the SJVAB, as of 2023, based on the NAAQS and CAAQS, respectively.

Table 4.3-2: Attainment Status for the San Joaquin Valley Air Pollution Control District

Pollutant	Designation/Classification	
	Federal	State
Ozone	Nonattainment/Extreme[a,b]	Nonattainment/Severe
PM_{10}	Attainment[c]	Nonattainment
$PM_{2.5}$	Nonattainment[d]	Nonattainment
Carbon monoxide (CO)	Unclassifiable/Attainment	Attainment/Unclassified
Nitrogen dioxide (NO_2)	Unclassifiable/Attainment	Attainment
Sulfur dioxide (SO_2)	Attainment/Unclassified	Attainment
Lead (Pb)	Unclassifiable/Attainment	Attainment
Hydrogen sulfide (H_2S)	No Federal Standard	Unclassified
Sulfates (SO_4^{2-})	No Federal Standard	Attainment
Visibility reducing particulate	No Federal Standard	Unclassified

Source: SJVAPCD 2023a

Notes:

[a] Even though the U.S. Environmental Protection Agency (EPA), revoked the federal 1-hour ozone standard, including associated designations and classifications in 2005, the EPA had previously classified the San Joaquin Valley Air Basin (SJVAB) as extreme nonattainment for this standard. The EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010. Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB.

[b] Though the San Joaquin Valley (SJV) was initially classified as serious nonattainment for the 1997 8-hour ozone standard, the EPA approved reclassification to extreme nonattainment in the Federal Register on May 5, 2010.

[c] On September 25, 2008, the EPA redesignated the SJV to attainment for the PM_{10} standard and approved the PM_{10} Maintenance Plan.

[d] The SJV is designated nonattainment for the 1997, 2006 and 2012 $PM_{2.5}$ standard.

Key:

PM_{10} = particulate matter less than 10 microns

$PM_{2.5}$ = particulate matter less than 2.5 microns

While ozone in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground-level ozone can adversely affect the human respiratory system. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems, such as forests and foothill communities; agricultural crops; and some man-made materials, such as rubber, paint, and plastic. High levels of ozone may negatively affect immune systems, making people more susceptible to respiratory illnesses, including bronchitis and pneumonia. Ozone also accelerates aging and exacerbates preexisting asthma and bronchitis and, in cases with high concentrations, can lead to the development of asthma in active children. Active people, both children and adults, appear to be more at risk from ozone exposure than those with a low level of activity. Additionally, the elderly and those with respiratory disease are also considered sensitive populations for ozone.

Table 4.3-3: Ambient Air Quality in Kern County – California and National Standards

CARB Air Monitoring Station	Number of Days Exceeding CAAQS[a]			Maximum Monitored Concentration State			Number of Days Exceeding NAAQS[a]			Maximum Monitored Concentration National		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
1-Hour Ozone (O_3) (ppm)												
Bakersfield 5558 California Avenue	2	3	0	0.097	0.110	0.090	*	*	*	*	*	*
Oildale 3311 Manor Street	1	3	6	0.099	0.109	0.107	*	*	*	*	*	*
Maricopa Stanislaus Street	0	7	0	0.086	0.122	0.083	*	*	*	*	*	*
8-Hour Ozone (O_3) (ppm)												
Bakersfield 5558 California Avenue	28	25	11	0.088	0.098	0.081	24	25	11	0.088	0.098	0.081
Oildale 3311 Manor Street	20	24	46	0.087	0.096	0.095	16	23	43	0.084	0.096	0.095
Maricopa Stanislaus Street	45	40	11	0.080	0.096	0.077	41	38	10	0.080	0.095	0.077
CO (carbon monoxide) No data.												
NO_2 1-hour (ppm)												
Bakersfield 5558 California Avenue	0	0	0	0.067	0.050	0.057	0	0	0	0.0671	0.0504	0.0572
Shafter Walker St.	0	0	0	0.049	0.040	0.047	0	0	0	0.0493	0.0409	0.0478
SO_X (sulfur oxides) No data.												
PM_{10} 24-hour ($\mu g/m^3$)												
Bakersfield 5558 California Avenue	17	18	124	125.9	196.8	439.3	0	1	3	116.3	193.8	437.5
Oildale 3311 Manor Street	118	123	129	392.1	277.3	423.0	8	15	2	389.3	517.2	421.4

Table 4.3-3: Ambient Air Quality in Kern County – California and National Standards

CARB Air Monitoring Station	Number of Days Exceeding CAAQS[(a)]			Maximum Monitored Concentration State			Number of Days Exceeding NAAQS[(a)]			Maximum Monitored Concentration National		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
$PM_{2.5}$ 24-hour (µg/m												
Bakersfield 5558 California Avenue	*	*	*	*	*	*	12	44	40	59.1	150.7	72.3
Bakersfield-Golden State Highway	*	*	*	*	*	*	4	10	43	66.1	150.2	78.5
Bakersfield 410 E Planz Road	*	*	*	*	*	*	3	17	17	83.7	158.6	70.5

Source: Air Quality Impact Analysis.
Notes:
[(a)] Days exceeding CAAQS and NAAQS are measured number of days for O_3 and NO_2 and measured and estimated number of days, respectively, for PM_{10} and $PM_{2.5}$.
* No standard.
Key:
CAAQS = California Ambient Air Quality Standards
CARB = California Air Resources Board
NAAQS = National Ambient Air Quality Standards
NO_2 = nitrogen dioxide
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
ppb = parts per billion
ppm = parts per million
µg/m^3 = micrograms per cubic meter

People who work or play outdoors are at a greater risk for harmful health effects from ozone. Children and adolescents are also at greater risk because they are more likely than adults to spend time engaged in vigorous activities. Research indicates that children under 12 years of age spend nearly twice as much time outdoors daily than adults. Teenagers spend at least twice as much time as adults in active sports and outdoor activities. Also, children inhale more air per pound of body weight than adults, and they breathe more rapidly than adults. Children are less likely than adults to notice their own symptoms and avoid harmful exposures.

Ozone is an oxidant that is comparable to household bleach, which can kill living cells (such as germs or human skin cells) on contact. Ozone can damage the respiratory tract, causing inflammation and irritation, and it can induce symptoms such as coughing, chest tightness, shortness of breath, and worsening of asthmatic symptoms. Ozone in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. Exposure to levels of ozone above the current ambient air quality standard can lead to lung inflammation and lung tissue damage and a reduction in the amount of air inhaled into the lungs. Evidence has linked the onset of asthma to exposure to elevated ozone levels in exercising children. Elevated ozone concentrations also reduce crop and timber yields, damage native plants, and damage materials such as rubber, paints, fabric, and plastics (American Lung Association 2015).

Carbon Monoxide (CO)

CO is a colorless, odorless gas produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). CO is primarily a byproduct of motor vehicle exhaust, which contributes more than two-thirds of all CO emissions nationwide. In cities, automobile exhaust can cause as much as 95 percent of all CO emissions. These emissions can result in high concentrations of CO, particularly in local areas with heavy traffic congestion. Other sources of CO emissions include industrial processes and fuel combustion in sources such as boilers and incinerators. Despite an overall downward trend in concentrations and emissions of CO, some metropolitan areas still experience high levels of CO.

CO is essentially inert to plants and materials but can have significant effects on human health. CO enters the bloodstream and binds more readily to hemoglobin than oxygen, reducing the oxygen-carrying capacity of blood, thus reducing oxygen delivery to organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease. Healthy individuals are also affected, but only at higher levels of exposure. CO in the bloodstream reduces the blood's capacity for carrying oxygen to the heart, brain, and other parts of the body. Exposure to CO can cause chest pain in heart patients, headaches, and reduced mental alertness. At high concentrations, CO can cause heart difficulties in people with chronic diseases and can impair mental abilities. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, difficulty performing complex tasks, and in prolonged, enclosed exposure, death.

The adverse health effects associated with exposure to ambient and indoor concentrations of CO are related to concentration of carboxyhemoglobin in the blood. Health effects observed may include early onset of cardiovascular disease, behavioral impairment, decreased exercise

performance of young healthy men, reduced birth weight, Sudden Infant Death Syndrome, and increased daily mortality rate. Most of the studies evaluating adverse health effects of CO on the central nervous system examine high-level poisoning. Such poisoning results in symptoms ranging from common flu and cold symptoms (shortness of breath on mild exertion, mild headaches, and nausea) to unconsciousness and death. It has been reported that there is an association between daily death rate and exposure to ambient CO in Los Angeles County, where it is postulated that a concentration of 20.2 parts per million (ppm) (the highest daily concentration recorded during a four-year period) contributed to 11 out of 159 deaths. Additional studies conducted in Los Angeles and in Sao Paulo, Brazil, also suggest a relationship between daily death rates and CO concentrations.

No CO data are available for Kern County for 2019 through 2021. The SJVAPCD attainment status for CO is unclassified/attainment for federal standards and unclassified for State standards.

Nitrogen Dioxide (NO_2) and Oxides of Nitrogen (NO_X)

NO_2 is a reddish brown, highly reactive gas that is formed in the ambient air through the oxidation of nitric oxide. NO_X, the generic term for a group of highly reactive gases that contain nitrogen and oxygen in varying amounts, plays a major role in the formation of ozone, PM, and acid rain. NO_X emissions result from high-temperature combustion processes such as vehicle exhaust emissions and power plants. Home heaters and gas stoves can also produce substantial amounts of NO_2 in indoor settings. The majority of the NO_X emitted from combustion sources is in the form of nitrogen oxide (NO), while the balance is mainly NO_2. NO is oxidized by ozone in the atmosphere to NO_2 but some level of photochemical activity is needed for this conversion.

NO_X reacts with other pollutants to form, ground-level ozone, nitrate particles, acid aerosols, as well as NO_2, which cause respiratory problems. NO_X and the pollutants formed from NO_X can be transported over long distances, following the patterns of prevailing winds. Therefore, controlling NO_X is often most effective if done from a regional perspective, rather than focusing on the nearest sources.

Current scientific evidence links short-term NO_2 exposures, ranging from 30 minutes to 24 hours, with adverse respiratory effects including airway inflammation in healthy people and increased respiratory symptoms in people with asthma. Also, studies show a connection between breathing elevated short-term NO_2 concentrations, and increased visits to emergency departments and hospital admissions for respiratory issues, especially asthma (EPA 2023b. NO_X are ozone precursors that combine with ROGs to form ozone. See the "Ozone (O_3)" section above for a discussion of the health effects of ozone.

Direct inhalation of NO_X can also cause a wide range of health effects. NO_X can irritate the lungs, cause lung damage, and lower resistance to respiratory infections such as influenza. Short-term exposures (e.g., less than 3 hours) to low levels of NO_2 (a subset of NO_X) may lead to changes in airway responsiveness and lung function in individuals with preexisting respiratory illnesses. These exposures may also increase respiratory illnesses in children. Long-term exposures to NO_2 may lead to increased susceptibility to respiratory infection and may cause irreversible alterations in

lung structure. Other health effects associated with NO_X are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO_2 may lead to eye and mucus membrane aggravation, along with pulmonary dysfunction. NO_X can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals due to production of particulate nitrates. Airborne NO_X can also impair visibility. NO_X is a major component of acid deposition in California. NO_X may affect both terrestrial and aquatic ecosystems. NO_X in the air is a potentially significant contributor to a number of environmental effects such as acid rain and eutrophication in coastal waters. Eutrophication occurs when a body of water suffers an increase in nutrients that reduce the amount of oxygen in the water, producing an environment that is destructive to fish and other animal life.

NO_2 is toxic to various animals as well as to humans. Its toxicity relates to its ability to combine with water to form nitric acid in the eye, lung, mucus membranes, and skin. Studies of the health impacts of NO_2 include experimental studies on animals, controlled laboratory studies on humans, and observational studies. In animals, long-term exposure to NO_2 increases susceptibility to respiratory infections, lowering their resistance to diseases such as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO_2 can suffer lung irritation and, potentially, lung damage. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes, and with hospital admissions for respiratory conditions.

NO_X contribute to a wide range of environmental effects directly and when combined with other precursors in acid rain and ozone. Increased nitrogen inputs to terrestrial and wetland systems can lead to changes in plant species composition and diversity. Similarly, direct nitrogen inputs to aquatic ecosystems, such as those found in estuarine and coastal waters, can lead to eutrophication (a condition that promotes excessive algae growth, which can lead to a severe depletion of dissolved oxygen and increased levels of toxins harmful to aquatic life). Nitrogen, alone or in acid rain, also can acidify soils and surface waters. Acidification of soils causes the loss of essential plant nutrients and increased levels of soluble aluminum that are toxic to plants. Acidification of surface waters creates conditions of low pH and levels of aluminum that are toxic to fish and other aquatic organisms. NO_X also contribute to visibility impairment.

Table 4.3-3 summarizes NO_X data collected from Kern County monitoring stations. As indicated in the table, there have been no exceedances of the State standards, and no data are available to determine exceedances under federal standards. The SJVAPCD attainment status for NO_2 is attainment/unclassified for federal and attainment for State standards.

Particulate Matter (PM_{10} and $PM_{2.5}$)

PM pollution consists of very small aerosol and solid particles suspended in the air. PM is a mixture of materials that can include acids (such as nitrates and sulfates), organic chemicals, smoke, soot, dust, salt, acids, metals, and allergens (such as fragments of pollen or mold spores). PM also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. The EPA currently regulates two types of PM emissions: PM_{10} and $PM_{2.5}$. PM_{10} refers

to particles less than or equal to 10 microns in diameter and $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in diameter.

Respirable Particulate Matter (PM_{10})

PM_{10} can be emitted directly, or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like NO_X, sulfur oxides (SO_X), VOC, and ammonia, given the right meteorological conditions, can form PM in the form of nitrates (NO_3), SO_4^{2-}, and organic particles. These pollutants are known as secondary particulates, because they are not directly emitted, but are formed through complex chemical reactions in the atmosphere. Fugitive dust is mostly PM_{10}.

Table 4.3-3 summarizes the ambient PM_{10} data collected from the Bakersfield 5558 California Avenue and Oildale 3311 Manor Street monitoring stations near the project site and includes the maximum 24-hour and annual arithmetic average concentrations and the number of days above the federal and State standards. The SJVAPCD attainment status for the federal PM_{10} standards is attainment and the State PM_{10} standard is nonattainment/severe.

Fine Particulate Matter ($PM_{2.5}$)

Table 4.3-3 summarizes the ambient fine PM data collected from monitoring stations located near the project site. The SJVAPCD is in nonattainment for the federal and State $PM_{2.5}$ standards.

The size of particles is directly linked to their potential for causing health problems. PM_{10} particles pose problems because they can get deep into lungs and the bloodstream. Being even smaller, $PM_{2.5}$ will travel farther into the lungs and can have more severe health impacts. Exposure to $PM_{2.5}$ particles can affect both lungs and heart. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including (EPA 2023c):

- Premature death in people with heart or lung disease;
- Nonfatal heart attacks;
- Irregular heartbeat;
- Aggravated asthma;
- Decreased lung function; and
- Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

As a consequence of long-term exposure, $PM_{2.5}$ is a stronger risk factor for negative health effects than the coarse part of PM_{10} particles (particles in the 2.5 to 10 micron range). $PM_{2.5}$ constitutes a large portion of combustion particulates, including diesel particulate matter (DPM). The health risk from an inhaled dose of particulate matter depends on the size, composition, and concentration of the particles. Larger particles are generally filtered in the nose and throat, while particulate matter smaller than PM_{10} can settle in the bronchi and lungs and cause health problems. $PM_{2.5}$ can penetrate

into the gas-exchange regions of the lungs, and ultrafine particles ($PM_{0.1}$) may pass through the lungs to affect other organs, such as the brain. Combustion particulate matter emissions, including diesel exhaust, often consists of particles smaller than 0.1 microns.

Long-term exposure to fine particulates may contribute to pulmonary and systemic oxidative stress, inflammation, progression of atherosclerosis, and risk of ischemic heart disease and death. Short-term exposure may contribute to complications of atherosclerosis, thrombosis, and acute ischemic events and may lead to increased mortality and morbidity from cardiovascular and respiratory diseases.

PM_{10} and $PM_{2.5}$ have fundamentally distinct physical and chemical properties and health effects, and thus are separately regulated and measured.

The section below entitled "Oil and Gas Operations and Health Effects" further discusses potential health effects of $PM_{2.5}$ emissions, among other things.

PM emissions may also lead to visibility impairment or aesthetic impacts. Visibility degradation is caused by the absorption and scattering of light by particles and gases in the atmosphere before it reaches the observer. As the number of fine particles increases, more light is absorbed and scattered, resulting in less clarity, color, and visual range. Particles that reduce visibility the most have diameters in the range of 0.1 to 1.0 microns. Some types of particles such as sulfates scatter more light, particularly during humid conditions. $PM_{2.5}$ can be transported to other locations and contribute to visibility problems. $PM_{2.5}$ can also affect vegetation by damaging foliage, disrupting the chemical processes within plants, reducing light adsorption, and disrupting photosynthesis (SJVAPCD 2018, 3-5).

Sulfur Dioxide (SO_2)

SO_2 is typically emitted as a result of the combustion of a fuel containing sulfur. SO_2 is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. Fuels, such as natural gas, contain very little sulfur and consequently have very low SO_2 emissions when combusted. By contrast, fuels high in sulfur content, such as coal or heavy fuel oils, can emit very large amounts of SO_2 when combusted. Sources of SO_2 emissions come from every economic sector and include a wide variety of fuels, and other gases, liquids, and solids.

Current scientific evidence links short-term exposures to SO_2, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms. These effects are particularly important for asthmatics at elevated ventilation rates (e.g., while exercising or playing) (EPA 2023d). SO_X can also react with other compounds in the atmosphere to form small particles. These particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and can aggravate existing heart disease, leading to increased hospital admissions and premature death. High concentrations of SO_2 can result in temporary breathing impairment for asthmatic children and adults who are active outdoors. Short-term exposures of asthmatic individuals to elevated SO_2 levels during moderate activity may result in breathing difficulties that can be accompanied by symptoms such as wheezing, chest tightness, or shortness of breath. Other effects that have been

associated with longer-term exposures to high concentrations of SO_2, in conjunction with high levels of PM, include aggravation of existing cardiovascular disease, respiratory illness, and alterations in the lungs' defenses. SO_2 also is a major precursor to $PM_{2.5}$, which is a significant health concern, and is a primary contributor to poor visibility (see also health effects under "Particulate Matter [PM_{10} and $PM_{2.5}$]," above.)

Exposure to high concentrations of SO_2 for short periods of time can constrict the bronchi and increase mucous flow, making breathing difficult. Additional health effects of SO_2 are listed below.

- SO_2 can immediately irritate the lung and throat at concentrations greater than 6 ppm in many people.
- SO_2 can impair the respiratory system's defenses against foreign particles and bacteria, when exposed to concentrations less than 6 ppm for longer time periods.
- SO_2 can enhance the harmful effects of ozone. (Combinations of the two gases at concentrations occasionally found in the ambient air appear to increase airway resistance to breathing.)
- SO_2 tends to have more toxic effects when acidic pollutants, liquid or solid aerosols, and particulates are also present. (In the 1950s and 1960s, thousands of excess deaths occurred in areas where SO_2 concentrations exceeded 1 ppm for a few days and other pollutants were also high.) Effects are more pronounced among mouth breathers (e.g., people who are exercising or who have head colds). These effects are listed below.
  - SO2 concentrations can result in health problems, such as episodes of bronchitis requiring hospitalization associated with lower-level acid concentrations.
  - SO2 concentrations have been linked to self-reported respiratory conditions, such as chronic cough and difficult breathing, associated with acid aerosol concentrations (asthmatic individuals are especially susceptible to these effects. The elderly and those with chronic respiratory conditions may also be affected at lower concentrations than the general population).
  - Increased respiratory tract infections have been associated with longer-term, lower-level exposures to SO2 and acid aerosols.
  - SO2 concentrations are also known to result in subjective symptoms, such as headaches and nausea, in the absence of pathological abnormalities, due to long-term exposure.
- SO_2 easily injures many plant species and varieties, both native and cultivated. Some of the most sensitive plants include various commercially valuable pines, legumes, red and black oaks, white ash, alfalfa, and blackberry. The effects include:
  - Visible injury to the most sensitive plants at exposures as low as 0.12 ppm for 8 hours.
  - Visible injury to many other plant types of intermediate sensitivity at exposures of 0.30 ppm for 8 hours.

- Positive benefits from low levels, in a very few species growing on sulfur deficient soils.
- Increases in SO_2 concentrations accelerate the corrosion of metals, probably through the formation of acids. (SO_2 is a major precursor to acidic deposition.) SO_2 may also damage stone and masonry, paint, various fibers, paper, leather, and electrical components.
- Increased SO_2 also contributes to impaired visibility. Particulate sulfate, much of which is derived from SO_2 emissions, is a major component of the complex total suspended particulate mixture.

As shown in Table 4.3-2, the SJVAPCD is designated attainment or unclassified for all SO_2 State and federal ambient air quality standards, respectively. Due to the restrictions for the use of high sulfur fuels, reduction in gasoline and diesel sulfur contents and reduction in SO_2 emissions from other industrial sources, such as refineries, SO_2 pollution is no longer a major air quality concern in most of California, including the project site.

Lead (Pb)

Lead in the atmosphere occurs as PM. Main sources of lead emissions include leaded gasoline, battery manufacture, paint, ink, ceramics, ammunition, and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. After the phase-out of leaded gasoline between 1978 and 1987, secondary lead smelters, battery recycling, and manufacturing facilities became lead emission sources of greater concern. Current federal standards for lead have no attainment designation, but areas lacking an attainment designation are treated as being in attainment of the standard. The SJVAPCD is designated as attainment for State standards and lead is no longer monitored in the ambient air of the SJVAPCD.

Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food, water, soil, or dust. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children, resulting in learning deficits, and lowered intelligent quotients. Studies also show that lead may be a factor in high blood pressure and subsequent heart disease. Lead can also be deposited on the leaves of plants, presenting a hazard to grazing animals and humans through ingestion.

Reactive Organic Gases and Volatile Organic Compounds

Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases, including ROGs and VOCs. ROGs are a set of organic gases based on State rules and regulations. VOCs are similar to ROGs in that they include all organic gases except those exempted by federal law. The list of compounds excluded from the definition of VOC is provided by the SJVAPCD in SJVAPCD Rule 1020, Section 3.53. VOCs are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels. Combustion engine exhaust, oil refineries, and oil-fueled power plants are the primary sources of hydrocarbons. Another source of hydrocarbons is evaporation from petroleum fuels, solvents, dry-cleaning solutions, and paint.

The primary health effects of hydrocarbons result from the formation of ozone and its related health effects (see ozone health effects discussion above). High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. There are no separate federal or CAAQS for VOC. Carcinogenic forms of VOC are considered toxic air contaminants (TACs). An example is benzene, which is a carcinogen. The health effects of individual carcinogenic VOCs are described below under the heading "Toxic Air Contaminants."

Sulfates (SO_4^{2-})

Sulfates (SO_4^{2-}) are particulate products of combustion of sulfur-containing fossil fuels. When SO or SO_2 are exposed to oxygen they precipitate out into sulfates (SO_3 or SO_4^{2-}). Sulfates are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (that is, gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and is subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place relatively rapidly and completely in urban areas of California due to regional meteorological features.

CARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardiopulmonary disease. Sulfates are particularly effective in degrading visibility, and, because they are usually acidic, can harm ecosystems and damage materials and property.

Hydrogen Sulfide (H_2S)

H_2S is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas and can be emitted as the result of geothermal energy exploitation. In Kern County, H_2S is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations.

Exposure to low concentrations of H_2S may irritate the eyes, nose, and throat. It may also cause difficulty in breathing for some asthmatics. Exposure to higher concentrations (above 100 ppm) of H_2S can cause olfactory fatigue, respiratory paralysis, and death. Brief exposures to high concentrations of H_2S, greater than 500 ppm, can cause a loss of consciousness. In most cases, the person appears to regain consciousness without any other effects. However, in many individuals, there may be permanent or long-term effects such as headaches, poor attention span, poor memory, and poor motor function. No health effects have been found in humans exposed to typical environmental concentrations of H_2S, 0.00011 to 0.00033 ppm. Deaths due to inhaling large amounts of H_2S have been reported in a variety of different work settings, including sewers, animal processing plants, waste dumps, sludge plants, oil and gas well drilling sites, and tanks and cesspools. Current federal standards for H_2S have no attainment designation and the SJVAPCD is designated as unclassified for State standards.

Visibility Reducing Particulates

Visibility reducing particles are a mixture of suspended PM consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt.

This standard is a measure of visibility. CARB does not yet have a measurement method that is accurate or precise enough to designate areas in the state as being in attainment or nonattainment. Thus, the entire state is unclassified.

Vinyl Chloride

Vinyl chloride monomer is a sweet smelling, colorless gas at ambient temperature. Landfills, publicly owned treatment works, and polyvinyl chloride (PVC) production are the major identified sources of vinyl chloride emissions in California. PVC can be fabricated into several products, such as pipes, pipefittings, and plastics. In humans, epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of liver angiosarcoma, which is a rare cancer, and have suggested a relationship between exposure and cancers of the lung and brain. There are currently no adopted ambient air standards for vinyl chloride.

Acute exposure of humans to high levels of vinyl chloride via inhalation has resulted in effects on the central nervous system, such as dizziness, drowsiness, headaches, and giddiness.

Vinyl chloride is reported to be slightly irritating to the eyes and respiratory tract in humans. Acute exposure to extremely high levels of vinyl chloride has caused loss of consciousness, irritation to the lungs and kidneys, and inhibition of blood clotting in humans and cardiac arrhythmias in animals.

Tests involving acute exposure of mice to vinyl chloride have shown a high acute toxicity from inhalation exposure to the substance. Long-term exposure to vinyl chloride concentrations has been linked with chronic health effects:

- Liver damage may result in humans from chronic exposure to vinyl chloride, through both inhalation and oral exposure.
- A small percentage of individuals occupationally exposed to high levels of vinyl chloride in air have developed a set of symptoms termed “vinyl chloride disease,” which is characterized by Raynaud’s phenomenon (fingers blanch and numbness and discomfort are experienced upon exposure to the cold), changes in the bones at the end of the fingers, joint and muscle pain, and scleroderma-like skin changes (thickening of the skin, decreased elasticity, and slight edema).
- Central nervous system effects (including dizziness, drowsiness, fatigue, headache, visual and/or hearing disturbances, memory loss, and sleep disturbances) as well as peripheral nervous system symptoms (peripheral neuropathy, tingling, numbness, weakness, and pain in fingers) have also been reported in workers exposed to vinyl chloride.

Several reproductive/developmental health effects from vinyl chloride exposure have been identified:

- Several case reports suggest that male sexual performance may be affected by vinyl chloride. However, these studies are limited by lack of quantitative exposure information and possible co-occurring exposure to other chemicals.
- Several epidemiological studies have reported an association between vinyl chloride exposure in pregnant women and an increased incidence of birth defects, while other studies have not reported similar findings.
- Epidemiological studies have suggested an association between men occupationally exposed to vinyl chloride and miscarriages in their wives' pregnancies, although other studies have not supported these findings.

Long-term exposure to vinyl chloride has also been identified as a cancer risk:

- Inhaled vinyl chloride has been shown to increase the risk of a rare form of liver cancer (angiosarcoma of the liver) in humans.
- Animal studies have shown that vinyl chloride, via inhalation, increases the incidence of angiosarcoma of the liver and cancer of the liver.

Toxic Air Contaminants

Hazardous air pollutants (HAPs) is a term used by the federal Clean Air Act (CAA) that includes a variety of pollutants generated or emitted by industrial production activities. Called TACs under California law (see Health and Safety Code §§ 39650 et seq.), 10 pollutants have been identified through ambient air quality data as posing the most substantial health risk in California. Direct exposure to all of these pollutants has been shown to cause cancer, birth defects, damage to brain and nervous system and respiratory disorders. CARB provides emission inventories for TACs for only the larger air basins in the state.

Emissions from the top 10 TACs in the SJVAB are presented in Table 4.3-4. Similar to the criteria pollutants, TACs are emitted from stationary sources, areawide sources, mobile sources, and natural sources.

Table 4.3-4: 2022 Toxic Air Contaminant Emissions in the San Joaquin Valley Air Basin (tons per year)

Toxic Air Contaminant	Emissions (tons/year)
Acetaldehyde	3,512
Diesel particulate matter	2,520
Formaldehyde	2,318
Benzene	1,020
Perchloroethylene	448

Table 4.3-4: 2022 Toxic Air Contaminant Emissions in the San Joaquin Valley Air Basin (tons per year)

Toxic Air Contaminant	Emissions (tons/year)
1,3-Butadiene	269
Methylene chloride	247
PAHs	238
Manganese	217
Acrolein	153

Source: SJVAPCD 2023.
Key:
SJV = San Joaquin Valley
SJVAB = San Joaquin Valley Air Basin

TACs do not have ambient air quality standards. Since no safe levels of TACs can be determined, there are no air quality standards for TACs. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. The requirements of the Air Toxic "Hot Spots" Information and Assessment Act apply to facilities that use, produce, or emit toxic chemicals. Facilities that are subject to the toxic emission inventory requirements of the Act must prepare and submit toxic emission inventory plans and reports, and periodically update those reports. Of the county portion of the SJVAB, no facility in the SJVAPCD has reported cancer risk exceeding 10 in 1 million or a hazard index over 1.0 and, therefore, are not considered significant by the standards of the Hot Spots program in the SJVAPCD.

Health Effects and Risks of Toxic Air Contaminants

Acetaldehyde

Acetaldehyde is classified as a federal HAP and as a California TAC. Acetaldehyde is both directly emitted into the atmosphere and formed in the atmosphere from photochemical oxidation. Sources include combustion processes such as exhaust from mobile sources and fuel combustion from stationary internal combustion engines, boilers, and process heaters. In California, photochemical oxidation is the largest source of acetaldehyde concentrations in the ambient air. According to CARB (2009), approximately 85 percent of the emissions of acetaldehyde in the SJVAB are from mobile sources—primarily diesel-fueled. Areawide sources, such as residential wood combustion, account for approximately 10 percent. However, in general, acetaldehyde concentrations are higher indoors than outdoors, due in part to the abundance of combustion sources, such as cigarettes, fireplaces, and woodstoves.

The primary acute effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans. At higher exposure levels, erythema, coughing, pulmonary edema, and necrosis may also occur. Acute inhalation of acetaldehyde resulted in a depressed respiratory rate and elevated blood pressure in experimental animals. Tests involving acute exposure of rats, rabbits, and hamsters have demonstrated acetaldehyde to have low acute toxicity from inhalation and moderate acute toxicity from oral or dermal exposure.

Benzene

Benzene is highly carcinogenic and occurs throughout California. Benzene also has non-cancer-related health effects. The primary sources of benzene emissions in the SJVAB are mobile sources (approximately 67 percent) and stationary sources (approximately 32 percent). The mobile source emissions are primarily gasoline-fueled.

Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness. Neurological symptoms of inhalation exposure to benzene include drowsiness, dizziness, headaches, and unconsciousness in humans. Ingestion of large amounts of benzene may result in vomiting, dizziness, and convulsions in humans. Exposure to benzene in liquid and vapor form may irritate the skin, eyes, and upper respiratory tract in humans. Redness and blisters may result from dermal exposure to benzene.

Chronic inhalation of certain levels of benzene causes blood disorders in humans; specifically, benzene affects bone marrow (the tissues that produce blood cells). Aplastic anemia, excessive bleeding, and damage to the immune system (by changes in blood levels of antibodies and loss of white blood cells) may develop. Increased incidence of leukemia (cancer of the tissues that form white blood cells) has been observed in humans who have been occupationally exposed to benzene.

1,3-Butadiene (vinyl ethylene)

1,3-butadiene has been identified as a carcinogen in California. The majority of 1,3-butadiene emissions come from incomplete combustion of petroleum-based fuels. Mobile sources account for 48 percent of total SJVAB emissions. Area sources, such as agricultural waste burning, open burning associated with forest management, and woodstoves and fireplaces, contribute to approximately 27 percent. Since the majority of 1,3-butadiene emissions are from incomplete combustion of gasoline and diesel fuels, CARB's 1990 adopted low-emission vehicle/clean fuels regulations and the 1996 Phase II reformulated gasoline regulations are expected to continue to reduce 1,3-butadiene emissions from cars and light-duty trucks as the fleet turns over and new low-emission vehicles are introduced into the fleet.

At very high levels, butadiene vapors cause neurological effects, such as blurred vision, fatigue, headache, and vertigo. Dermal exposure of humans to 1,3-butadiene causes a sensation of cold, followed by a burning sensation, which may lead to frostbite.

One epidemiological study reported that chronic (long-term) exposure to 1,3-butadiene by inhalation resulted in an increase in cardiovascular diseases, such as rheumatic and arteriosclerotic heart diseases, while other human studies have reported effects on the blood. A large epidemiological study of synthetic rubber industry workers demonstrated a consistent association between 1,3-butadiene exposure and occurrence of leukemia. Several epidemiological studies of workers in styrene-butadiene rubber factories have shown an increased incidence of respiratory, bladder, stomach, and lymphato-hematopoietic cancers. However, these studies are not sufficient to determine a causal association between 1,3-butadiene exposure and cancer, due to possible exposure to other chemicals and other confounding factors.

Carbon Tetrachloride (tetrachloromethane)

Carbon tetrachloride is a central nervous system depressant, which the EPA has classified as a Group B2, a probable human carcinogen. The primary sources of carbon tetrachloride in California include chemical and allied product manufacturers and petroleum refineries. Unlike many of the other TACs, carbon tetrachloride is emitted primarily by sources other than motor vehicles, and there are virtually no emissions within the SJVAB or California.

Acute inhalation and oral exposures to high levels of carbon tetrachloride have been observed primarily to damage the liver (swollen, tender liver, changes in enzyme levels, and jaundice) and kidneys (nephritis, nephrosis, proteinuria) of humans. Depression of the central nervous system has also been reported. Symptoms of acute exposure in humans include headache, weakness, lethargy, nausea, and vomiting. Delayed pulmonary edema (fluid in lungs) has been observed in humans who have been exposed to high levels of carbon tetrachloride by inhalation and ingestion, but this is believed to be due to injury to the kidney rather than direct action of carbon tetrachloride on the lung. Chronic inhalation or oral exposure to carbon tetrachloride produces liver and kidney damage in humans and animals.

Chromium, Hexavalent

Hexavalent chromium emissions come mainly from electric generation, aircraft and parts manufacturing, and fabricated metal produce manufacturing. In California, hexavalent chromium has been identified as a carcinogen. Epidemiological evidence suggests that exposure to inhaled hexavalent chromium may result in lung cancer.

The respiratory tract is the major target organ for chromium (VI) following inhalation exposure in humans. Other effects noted from acute inhalation exposure to very high concentrations of chromium (VI) include gastrointestinal and neurological effects, while dermal exposure causes skin burns in humans. Chronic inhalation exposure to chromium (VI) in humans results in effects on the respiratory tract, with perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, asthma, and nasal itching and soreness reported. Chronic human exposure to high levels of chromium (VI) by inhalation or oral exposure may produce effects on the liver, kidney, gastrointestinal and immune systems, and possibly the blood.

para-Dichlorobenzene

In California, para-dichlorobenzene has been identified as a carcinogen. In addition to the carcinogenic impact, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans. Para-dichlorobenzene is a chlorinated aromatic hydrocarbon (NPIC 2010). It was first registered for use in the United States in 1942, and it is sometimes called 1,4-dichlorobenzene. It is a fumigant insecticide and repellent. Para-dichlorobenzene turns directly from a solid into a gas, a process called sublimation.

The primary sources of para-dichlorobenzene include consumer products such as non-aerosol insect repellents and solid/gel air fresheners. These sources contribute to 97 percent of SJVAB para-dichlorobenzene emissions.

People who have been exposed to para-dichlorobenzene have experienced nausea, vomiting, dizziness, fatigue, and headaches. Para-dichlorobenzene vapor can also irritate the eyes and nasal passages. It may also cause kidney and liver damage in pets.

Formaldehyde

Formaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Photochemical oxidation is the largest source of formaldehyde concentrations in California ambient air. Directly emitted formaldehyde is a product of incomplete combustion. One of the primary sources of formaldehyde is vehicular exhaust. In fact, approximately 76 percent of the formaldehyde emissions in the SJVAB are from mobile sources, of which the source is predominantly diesel-fueled. Formaldehyde is also used in resins, fumigants, and soil disinfectants, and it can be found in many consumer products as an antimicrobial agent.

The major toxic effects caused by acute formaldehyde exposure via inhalation are eye, nose, and throat irritation and effects on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains, and bronchitis. Chronic exposure to formaldehyde by inhalation in humans has been associated with respiratory symptoms and irritation of the eye, nose, and throat. Animal studies have reported effects on the nasal respiratory epithelium and lesions in the respiratory system from chronic inhalation exposure to formaldehyde.

Occupational studies have noted statistically significant associations between exposure to formaldehyde and increased incidence of lung and nasopharyngeal cancer. This evidence is considered to be "limited," rather than "sufficient," due to possible exposure to other agents that may have contributed to the excess cancers. The EPA considers formaldehyde to be a probable human carcinogen and has ranked it in EPA Group B1. In California, formaldehyde has been identified as a carcinogen.

Methylene Chloride (dichloromethane)

In California, methylene chloride has been identified as a carcinogen. In addition, chronic exposure can lead to bone marrow, hepatic, and renal toxicity. Methylene chloride is used as a solvent, a blowing and cleaning agent in the manufacture of polyurethane foam and plastic fabrication, and as a solvent in paint stripping operations. Approximately 80 percent of the SJVAB emissions of methylene chloride are from paint removers/strippers, automotive brake cleaners, and other consumer products. The statewide trend for methylene chloride shows that by comparing the statewide average methylene chloride concentration for 1990 to 1992 to that for 2005 to 2007 the result is a 77 percent decrease in both concentration and health risk.

Case studies of methylene chloride poisoning during paint stripping operations have demonstrated that inhalation exposure to extremely high levels of methylene chloride can be fatal to humans. Acute inhalation exposure to high levels of methylene chloride in humans has affected the central nervous system including decreased visual, auditory, and psychomotor functions, but these effects are reversible once exposure ceases. Methylene chloride also irritates the nose and throat at high concentrations. The major effects from chronic inhalation exposure to methylene chloride in humans are effects on the central nervous system, such as headaches, dizziness, nausea, and

memory loss. In addition, chronic exposure can lead to bone marrow, hepatic, and renal toxicity. The EPA considers methylene chloride to be a probable human carcinogen and has ranked it in EPA Group B2. The State of California considers methylene chloride to be a carcinogen.

Perchloroethylene (tetrachloroethylene)

In California, tetrachloroethylene (PERC) has been identified as a carcinogen. PERC vapors are irritating to the eyes and respiratory tract. Following chronic exposure, workers have shown signs of liver toxicity as well as kidney dysfunction and neurological disorders.

PERC is used as a solvent, primarily in dry-cleaning operations. PERC is also used in degreasing operations, paints and coatings, adhesives, aerosols, specialty chemical production, printing inks, silicones, rug shampoos, and laboratory solvents. In the SJVAB, approximately 65 percent of the emissions of PERC are from such stationary sources as dry-cleaning plants and manufacturers of aircraft parts and fabricated metal parts. Areawide sources contribute approximately 35 percent. In comparing the statewide PERC concentration for 1990 to 1992 to that for 2005 to 2007 the result is an 84 percent decrease in both concentration and health risk.

Breathing PERC for short periods of time can adversely affect the human nervous system. Effects range from dizziness, fatigue, headaches, and sweating to incoordination and unconsciousness. Contact with PERC liquid or vapor irritates the skin, eyes, nose, and throat. These effects are not likely to occur at levels of PERC that are normally found in the environment (EPA 1994).

Breathing PERC over longer periods of time can cause liver and kidney damage in humans. Workers exposed repeatedly to large amounts of PERC in air can also experience memory loss and confusion. Laboratory studies show that PERC causes kidney and liver damage and cancer in animals exposed repeatedly by inhalation and by mouth. Repeat exposure to large amounts of PERC in air may likewise cause cancer in humans.

Diesel Particulate Matter

Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde, and nickel) have the potential to contribute to mutations in cells that can lead to cancer. More than 40 diesel exhaust components are listed by the State and federal government as TACs or HAPs, respectively. In California, particulate emissions from diesel-fueled engines has been identified as a carcinogen (17 California Code of Regulations [CCR] § 93000). Most researchers believe that diesel exhaust particles contribute the majority of the risk because the particles in the exhaust carry many harmful organics and metals.

DPM is emitted from both mobile and stationary sources. In the SJVAB, on-road diesel-fueled vehicles contribute approximately 61 percent of the total, with an additional 38 percent attributed to other diesel-fueled mobile sources such as construction and agricultural equipment.

Long-term exposure to diesel exhaust particles poses the highest cancer risk of any TAC evaluated by the California Office of Environmental Health Hazard Assessment (OEHHA). CARB estimates

that about 70 percent of the cancer risk that the average Californian faces from breathing TACs stems from diesel exhaust particles.

In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers, and equipment operators. The studies showed these workers were more likely than workers who were not exposed to diesel emissions to develop lung cancer. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. Using information from OEHHA's assessment, CARB estimates that diesel-particle levels measured in California's air in 2000 could cause 540 "excess" cancers (beyond what would occur if there were no diesel particles in the air) in a population of 1 million people over a 70-year lifetime (OEHHA 2002).

Other researchers and scientific organizations, including the National Institute for Occupational Safety and Health, have calculated similar cancer risks from diesel exhaust as those calculated by the OEHHA and CARB.

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks.

Diesel engines are a major source of fine-particle pollution*, especially $PM_{2.5,}$ which has specific health risks as noted previously in this section*. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution.

Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among people suffering from respiratory problems. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can reduce lung function in children. In California, diesel exhaust particles have been identified as carcinogens.

Polycyclic Aromatic Hydrocarbons

The term polycyclic aromatic hydrocarbons (PAHs) refers to a group of several hundred chemically related, environmentally persistent organic compounds of various structures and varied toxicity. Most of them are formed by a process of thermal decomposition (pyrolysis) and subsequent recombination (pyrosynthesis) of organic molecules. PAHs enter the environment through various routes and are usually found as a mixture containing two or more of these compounds (e.g., soot). They have been shown to cause carcinogenic and mutagenic effects and are potent immunosuppressants. Effects have been documented on immune system development. They are byproducts of natural gas combustion.

Other Health Effects

Valley Fever

Valley Fever or coccidioidomycosis is one of the most studied and oldest known fungal infections. Coccidioidomycosis was first discovered in the early 1890s in Domingo Ezcurra, an Argentinean soldier, and in 1900 was established as a fungal disease. After an outbreak in the 1930s in the SJV of California, this disease was given its nickname "San Joaquin Valley Fever," often shortened further to "Valley Fever" (Los Angeles County Department of Health Services, Public Health 2004).

Valley Fever is primarily a disease of the lungs caused by inhalation of spores of the *Coccidioides immitis* fungus. The *Coccidioides* fungus resides in the soil in southwestern United States, northern Mexico, and parts of Central and South America. When weather and moisture conditions are favorable, the fungus "blooms" and forms many tiny spores that lie dormant in the soil. The spores are found in the top few inches of soil, become airborne when the soil is disturbed by wind, vehicles, excavation, or other ground-moving activities, and are subsequently inhaled into the lungs. 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.

Infection occurs when the spores of the fungus become airborne and are inhaled. The fungal spores become airborne when contaminated soil is disturbed by human activities, such as construction and agricultural activities, and natural phenomenon, such as windstorms, dust storms, and earthquakes.

Valley Fever symptoms generally occur within two to three weeks of exposure. Approximately 60 percent of Valley Fever cases are mild and display flu-like symptoms or no symptoms at all. The remainder developed flu-like symptoms (fatigue, cough, chest pain, fever, rash, headache, and joint aches) that can last for a month and tiredness that can sometimes last for longer than a few weeks. In some cases, painful red bumps may develop. A small percentage of infected persons (<1 percent) can develop disseminated disease that spreads outside the lungs to the brain, bone, and skin. Without proper treatment, Valley Fever can lead to severe pneumonia, meningitis, and even death. Symptoms may appear between one to four weeks after exposure.

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 requires specific laboratory tests such as: (1) microscopic identification of the fungal spherules in the infected tissue, sputum, or body fluid sample; (2) growing a culture of *Coccidioides immitis* from a tissue specimen, sputum, or body fluid; (3) detecting 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 indicates prior exposure to the fungus.

Valley Fever is not contagious and, therefore, cannot be passed from person to person. Most of those who are infected will recover without treatment within six months and will have a lifelong immunity to the fungal spores. In severe cases, such as 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. Only 1 percent to 2 percent of those exposed who seek medical attention will develop a disease that disseminates (spreads) to other parts of the body other than the lungs. Table 4.3-5 presents the various infection classifications and normal diagnostic spread of Valley Fever cases.

Table 4.3-5: Range of Valley Fever Cases

Infection Classification	Percent of Total Diagnosed Cases
Asymptomatic infections	60
Infections that resolve spontaneously (with lifelong immunity)	35
Chronic disease or disease disseminated throughout the body	Up to 5
Meningeal infection (affecting brain and/or spinal cord and requiring lifetime treatment)	0.15–0.75

Source: Hector 2005

Factors that affect the susceptibility to coccidioidal dissemination are race, sex, pregnancy, age, and immunosuppression. According to data gathered by the Kern County Public Health Services Department, Hispanic and Latino Americans are 3.4 times more likely than whites to develop coccidioidal dissemination, African Americans are 13.7 times more likely, and Filipinos are 175.5 times more likely. Regarding the number of deaths attributed to the disease, compared to whites, the number of Hispanic/Latino is five times greater; African Americans, 23.3 times greater; and Filipinos, 191.4 times greater. In addition, residents new to the SJV are at a higher risk of infection due primarily to low immunity to this particular fungus (see also KCPHS 2014).

Asbestos

Asbestos is the name given to a number of naturally occurring fibrous silicate minerals that have been mined for their useful properties such as thermal insulation, chemical and thermal stability, and high tensile strength. The three most common types of asbestos are chrysotile, amosite, and crocidolite. Ultramafic, serpentinized rock is closely associated with asbestos and is chemically composed of the following list of minerals:

- Antigorite, $(Mg, Fe)_3S\ i_2O_5(OH)_4$
- Clinochrysotile, $Mg_3S\ i_2O_5(OH)_4$
- Lizardite, $Mg_3S\ i_2O_5(OH)_4$
- Orthrochrysotile, $Mg_3Si_2O_5(OH)_4$
- Parachrsotile, $(Mg, Fe)_3Si_2O_5(OH)_4$

These minerals have essentially the same chemistry but different structures. Chrysotile minerals are more likely to form serpentinite asbestos; however, serpentinite is uncommon to sedimentary soil found in the proposed project area.

Asbestos can adversely affect humans only in its fibrous form, and these fibers must be broken and dispersed into the air and then inhaled. During geological processes (e.g., fault movement), the asbestos mineral can be crushed, causing it to become airborne. It also enters the air or water from the breakdown of natural deposits. Constant exposure to asbestos at high levels on a regular basis may cause cancer in humans. The two most common forms of cancer are lung cancer and mesothelioma, a rare cancer of the lining that covers the lungs and stomach.

Chrysotile, also known as white asbestos, is the most common type of asbestos found in buildings. Chrysotile makes up approximately 90 percent to 95 percent of all asbestos contained in buildings in the United States. Project construction sometimes requires the demolition of existing buildings where construction occurs. Buildings often include materials containing asbestos. Most demolitions and many renovations are subject to an asbestos inspection prior to start of activity. The demolition, renovation, or removal of asbestos-containing building materials (ACBM) is subject to the limitations of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations as listed in the Code of Federal Regulations (CFR) requiring notification, inspection, and compliance with local air district regulations. The SJVAPCD requires compliance with NESHAP and has adopted Rule 4002.

In addition, asbestos is also found in a natural state. Exposure and disturbance of rock and soil that naturally contains asbestos can result in the release of fibers to the air and consequent exposure to the public. Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysotile asbestos. In addition, another form of asbestos, tremolite, can be found associated with ultramafic rock, particularly near faults. Sources of asbestos emissions include unpaved roads or driveways surfaced with ultramafic rock, construction activities in ultramafic rock deposits, or rock quarrying activities where ultramafic rock is present.

To address some of the health concerns associated with exposure to asbestos from these activities, CARB has adopted two Airborne Toxic Control Measures (ATCMs). CARB has an ATCM for construction, grading, quarrying, and surface mining operations requiring the implementation of mitigation measures to minimize emissions of asbestos-laden dust. This ATCM applies to road construction and maintenance, construction and grading operations, and quarries and surface mines when the activity occurs in an area where naturally occurring asbestos is likely to be found. Areas are subject to the regulation if they are identified on maps published by the California Department of Conservation as ultramafic rock units or if the Air Pollution Control Officer (APCO) or owner/operator has knowledge of the presence of ultramafic rock, serpentine, or naturally occurring asbestos on the site. The ATCM also applies if ultramafic rock, serpentine, or asbestos is discovered during any operation or activity.

In addition, CARB has an ATCM for surfacing applications. This ATCM applies to any person who produces, sells, supplies, offers for sale or supply, uses, applies, or transports any: (1) aggregate material extracted from property where any portion of the property is located in a

geographic ultramafic rock unit; or (2) aggregate material extracted from property that is not located in a geographic ultramafic rock unit, if:

- The material has been evaluated at the request of the APCO and determined to be ultramafic rock or serpentine.
- Material tested at the request of the APCO is determined to have an asbestos content of 0.25 percent or greater or is determined by the owner/operator of a facility to be ultramafic rock or serpentine.
- The material has an asbestos content of 0.25 percent or greater.

The ATCM prohibits a person from using, applying, selling, supplying, or offering for sale or supply any restricted material for surfacing unless it has been tested and determined to have an asbestos content that is less than 0.25 percent.

Carbon Dioxide CO_2

Carbon dioxide is considered minimally toxic by inhalation and is classified as an asphyxiant, displacing the oxygen in air. Symptoms of CO_2 exposure may include headache and drowsiness. Individuals exposed to higher concentrations may experience rapid breathing, confusion, increased cardiac output, elevated blood pressure, and increased arrhythmias. Extreme CO_2 concentrations can lead to death by asphyxiation. (Mathews 2022; Appendix B-2)

Additionally, Carbon dioxide, along with several other compounds, is considered a greenhouse gas that is contributing to climate change. Discussion of carbon dioxide and other greenhouse gas is included in Section 4.8, Greenhouse Gas Emissions of this EIR.

Sensitive and Worker Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Land uses that can be considered sensitive receptors include residential communities, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Sensitive individuals with compromised immune systems, such as children and the elderly, may be exposed to emissions from the construction and operation of the project. Worker receptors refer to employees and locations where people work. Impacts on sensitive receptors are of particular concern, because they are the people most vulnerable to the effects of air pollution.

Odorous Compounds

Odor refers to the perception or sensation experienced when one or more volatilized chemical compounds come in contact with receptors on the olfactory nerves. Odorant refers to any volatile chemical in the air that is part of the perception of odor by a human. The difference in sensory and physical responses experienced by individuals is responsible for the significant variability in the individual sensitivity to the quality and intensity of an odorant.

4.3.3 Regulatory Setting

Air quality in the project area is addressed through the efforts of various federal, state, regional, and local government agencies. The agencies primarily responsible for improving the air quality within the county include the EPA, CARB, SJVAPCD, and the Kern Council of Governments (COG). These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policymaking, education, and a variety of programs. The agencies primarily responsible for improving the air quality within Kern County are discussed below, along with their individual responsibilities.

Federal

The principal air quality regulatory mechanism on the federal level is the CAA as amended in 1990 and, in particular, the NAAQS established by the EPA pursuant to the CAA. These standards identify levels of air quality for "criteria" pollutants that are considered the maximum levels of ambient (background) air considered safe, with an adequate margin of safety, to protect public health and welfare. The criteria pollutants include ozone, CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, which is a form of SO_X, and Pb. The EPA also has regulatory and enforcement jurisdiction over emission sources beyond state waters (outer continental shelf), and those that are under the exclusive authority of the federal government, such as aircraft, locomotives, and interstate trucking. The EPA's primary role at the state level is to oversee the State air quality programs. The EPA sets federal vehicle and stationary source emission standards and oversees approval of all State Implementation Plans (SIPs), as well as providing research and guidance in air pollution programs. The SIP is a state-level document that identifies all air pollution control programs within California that are designed to help the State meet the NAAQS.

Attainment defines the status of a given airshed with regard to NAAQS requirements. Airsheds not meeting these standards are classified as "nonattainment."

Title V and Extreme Designation

Title V of the federal CAA, as amended in 1990, creates an operating permits program for facilities classified as major emission sources. Major emission sources are those that emit pollutants above the major source threshold applicable to the location of the emission source. In general, major source thresholds are 100 tons per year for any criteria pollutant. However, this will vary depending on the attainment status of the source's location. In an ozone extreme nonattainment area, such as the project area, sources that emit more than 10 tons per year of NO_X and ROG are classified as major sources for Title V permitting. This results in more businesses having to comply with Title V permitting requirements under the Extreme nonattainment designation.

Title V does not impose any new air pollution standards, require installation of any new controls on the affected facilities, or require reductions in emissions. Title V enhances public and EPA participation in the permitting process and requires additional recordkeeping and reporting by businesses, which results in significant administrative requirements.

EPA Emission Standards

The EPA establishes and maintains emission standards of performance of new stationary sources under CAA Section 111(b), as the New Source Performance Standards (40 CFR 60). Categories of existing stationary sources can also be retroactively controlled under CAA Section 111(d).

Categories of sources that cause HAP emissions are controlled through separate standards under CAA Section 112: NESHAP. These standards are specifically designed to reduce the potency, persistence, or potential bioaccumulation of toxic air pollutants. The emission standards for HAPs under CAA Section 112 prevent adverse health risks and carcinogenic effects from targeted types of facilities.

State

California Air Resources Board

CARB, a department of the California Environmental Protection Agency, oversees air quality planning and control throughout California by administering the SIP. Its primary responsibility lies in ensuring implementation of the 1989 California Clean Air Act (CCAA), responding to the federal CAA requirements, and regulating emissions from motor vehicles sold in California. It also sets fuel specifications to further reduce vehicular emissions.

The CCAA establishes a legal mandate to achieve many of the CAAQS by the earliest practical date. These standards apply to the same criteria pollutants as the federal CAA, and also include sulfate, visibility reducing particulates, H_2S, and vinyl chloride. They are also more stringent than the federal standards.

CARB is also responsible for regulations pertaining to TACs. The "Tanner Act," enacted in 1983, directed CARB to identify TACs and to adopt ATCMs to "reduce, avoid, or eliminate the emissions of a toxic air contaminant." To date, CARB has formally identified 21 TACs and has adopted 26 ATCMs (CARB 2015). The Air Toxics "Hot Spots" Information and Assessment Act (Assembly Bill [AB] 2588; Health & Safety Code §§ 44300 et seq.) was enacted in 1987 as a means to establish a formal air toxics emission inventory risk quantification program. AB 2588, as amended, establishes a process that requires stationary sources to report the type and quantities of certain substances their facilities routinely release into their air basin. Each air pollution control district ranks the data into high, intermediate, and low priority categories. When considering the ranking, the potency, toxicity, quantity, volume, and proximity of the facility to receptors are given consideration by an air district. AB 2588 was amended in 1992 by Senate Bill (SB) 1731, and further modified by AB 564 in 1996. The goal of the Air Toxics "Hot Spots" Act, as amended, is to collect emission data indicative of routine predictable releases of toxic substances to the air, to identify facilities having localized impacts, to evaluate health risks from exposure to the emissions, to notify nearby residents of significant risks, and, reduce risk below the determined level of significance (CARB 2014).

CARB also has on-road and off-road engine emission reduction programs that indirectly affect the project's emissions through the phasing in of cleaner on-road and off-road equipment engines.

Additionally, CARB has a Portable Equipment Registration Program that allows owners or operators of portable engines and associated equipment to register their units under a statewide portable program to operate their equipment that must meet specified program emission requirements throughout California without having to obtain individual permits from local air districts.

The State has also enacted an ATCM for the reduction of DPM and criteria pollutant emissions from in-use, off-road, diesel-fueled vehicles (CCR Title 13, Article 4.8, Chapter 9, Section 2449). This regulation provides target emission rates for PM and NO_X emissions from owners of fleets of diesel-fueled off-road vehicles and applies to equipment fleets of three specific sizes and the target emission rates are reduced over time (CARB 2007).

Regulation of Air Pollution Transport between Air Basins

The CCAA directs CARB to assess the contribution of ozone and ozone precursors in upwind basins or regions to ozone concentrations that violate the state ozone standard in downwind basins or regions. The movement of ozone and ozone precursors between basins or regions is referred to as "transport." In addition, the CCAA directs CARB to establish mitigation requirements for upwind districts commensurate with their contributions to the air quality problems in downwind basins or regions.

Over the last decade, CARB has published several transport reports that include technical assessments of transport relationships between air basins and regions in California. Along with these technical assessments, the reports have included mitigation requirements to ensure that upwind areas do their part to limit the effects of transport on their downwind neighbors. CARB originally established mitigation requirements in 1990, which are contained in Title 17, CCR, Sections 70600 and 70601. These regulations were amended in 1993 and more recently in 2003. The 2003 amendments added two new requirements for upwind districts. These amendments require upwind districts to: (1) consult with their downwind neighbors and adopt "all feasible measures" for ozone precursors; and (2) amend their "no net increase" thresholds for permitting so that they are equivalent to those of their downwind neighbors. The amendments clarify that upwind districts are required to comply with the mitigation requirements, even if they attain the state ozone standard in their own district, unless the mitigation measures are not needed in the downwind district.

According to SJVAPCD, air pollution transported from the San Francisco Bay and Sacramento areas account for approximately 27 percent of the total emissions in the northern portion of the SJVAPCD (San Joaquin, Stanislaus, and Merced Counties). In the Central region (Fresno, Madera, and Kings Counties), the percentage drops to 11 percent, and in the south valley (the valley portion of Kern and Tulare counties), transported air pollution accounts for only 7 percent of the total problem.

The Mojave Desert Air Basin (MDAB) includes the desert portions of Los Angeles, Kern, San Bernardino, and Riverside counties. Most of this area is commonly referred to as the "high desert," because elevations range from approximately 2,000 to 5,000 feet above sea level. The MDAB is

characterized by extreme temperature fluctuations, strong seasonal winds, and clear skies. While the project limits do not extend into the Kern County portion of the MDAB, studies in the southern SJV, South Coast Air Basin, and other airsheds have included intensive ozone and meteorological measurements, tracer studies, and development of transport models (CARB 2009). The issue of ozone transport in the Kern County area has been studied for over 30 years. A study by Sonoma Technology (2006) recognized the significant ozone transport from the SJV into the Mojave Desert area through the Tehachapi Pass.

The topography and climate of Southern California combine to make the South Coast Air Basin an area with a high potential for air pollution, which constrains efforts to achieve clean air. During the summer months, a warm air mass frequently descends over the cool, moist marine layer produced by the interaction between the ocean's surface and the lowest layer of the atmosphere. The warm upper layer forms a cap over the cool marine layer and inhibits the pollutants in the marine layer from dispersing upward. In addition, light winds during the summer further limit ventilation. Furthermore, sunlight triggers the photochemical reactions which produce ozone, and this region experiences more days of sunlight than many other major urban areas in the nation (South Coast Air Quality Management District 2006). Transboundary ozone transport form Asia and its impact on air quality in the SJVAB is being further studied and increases in ozone levels due to transport have been confirmed (SJVAPCD 2013).

Assembly Bill 617

AB 617 (August 2017) directs CARB and all local air districts to take measures to protect communities disproportionately impacts by air pollution. The primary components of AB 617 include (1) community-level air monitoring; (2) a state strategy and community-specific emission reduction plans; (3) accelerated review of retrofit pollution control technologies on industrial facilities subject to Cap-and-Trade; (4) enhanced emission report requirements; and (5) increased penalty for polluter violations. Additionally, CARB may direct additional grant funding to communities determined to have the highest air pollution burdens.

In response to AB 617, CARB established the Community Air Protection Program. The Community Air Protection Program's focus is to reduce exposure in communities most impacted by air pollution. CARB staff has already begun working closely with local air districts, community groups, community members, environmental organizations, and regulated industries to develop a new community-focused action framework for community protection.

Local

San Joaquin Valley Air Pollution Control District

State law assigns much of the authority to regulate stationary, indirect, and area sources to local air pollution control and air quality management districts. The SJVAPCD has primary responsibility for regulating stationary sources of air pollution situated within its jurisdictional boundaries. To this end, the SJVAPCD implements air quality programs required by State and federal mandates, enforces rules and regulations based on air pollution laws, and educates businesses and residents about their role in protecting air quality. The SJVAPCD is responsible for regulating stationary,

indirect, and area sources of air pollution in the SJVAB. The eight counties that comprise the SJVAPCD are divided into three regions: the Northern Region (Merced, San Joaquin, and Stanislaus counties), Central Region (Madera, Fresno, and Kings Counties), and Southern Region (Tulare County and SJV portion of Kern County).

The SJV (or portions thereof) is designated as nonattainment with respect to federal air quality standards for ozone and $PM_{2.5}$. The SJV has a maintenance plan for PM_{10} and for CO for the urbanized/metropolitan areas of Kern, Fresno, Stanislaus, and San Joaquin counties.

The SJVAPCD is responsible for managing and permitting existing, new, and modified sources of air emissions within its boundaries and also established the following rules and regulations to ensure compliance with local, State, and federal air quality regulations:

Rules and Regulations

The following SJVAPCD Rules and Regulations apply to the oil and gas production industry and its ancillary facilities.

Regulation I (General Provisions)

Regulation I (General Provisions) is a series of rules that establish the basic framework for interacting with the SJVAPCD including enforcement procedures, inspections, and source sampling requirements, and regulatory accountability.

Regulation II (Permits)

Rule 2010 (Permits Required) requires any person constructing, altering, replacing, or operating any source operation which emits, may emit, or may reduce emissions to obtain an Authority to Construct (ATC) or a Permit to Operate (PTO).

Rule 2092 (Standards for Permits to Operate) defines the conditions that must be met for an APCO to issue a PTO.

Rule 2201 (New and Modified Stationary Source Review Rule) provides for the review of new and modified Stationary Sources of air pollution and to provide mechanisms including emission offsets by which Authorities to Construct such sources may be granted, without interfering with the attainment or maintenance of Ambient Air Quality Standards; and ensure that no net increase in emissions above specified thresholds from new and modified Stationary Sources of all nonattainment pollutants and their precursors occur.

Rule 2250 (Permit-Exempt Equipment Registration) is essentially an SJVAPCD rule designed to provide the SJVAPCD with oversight of equipment that would otherwise not require an air permit. According to the SJVAPCD's Permit-Exempt Equipment Registration (PEER) – Frequently Asked Questions document, "PEER is necessary to enforce the requirements of certain District prohibitory rules in which the emissions equipment is exempt from permitting requirements" (SJVAPCD 2008). Section 4.5 of Rule 2250 states that the District shall issue the PEER within 90 days of receipt of a completed application. Sections 4.7 and 4.8 of the rule specify

that a PEER unit is neither transferable between locations or owners without an application for transfer. See Rule 3155 for information on fees relating to PEER units. Additionally, Rules 4702, 4307, and 4622 define different types of PEER units.

Rule 2280 (Portable Equipment Registration) provides the administrative requirements for permitting portable emissions units for operation in participating districts throughout the state of California, starting in Sections 4.0 to 4.13 of the rule. To register portable equipment, an application must be submitted to the district in which operation will first occur. The Applicant shall provide the administering district with all necessary emissions and engineering data to demonstrate compliance with Section 5 of this rule. Section 4.4 states that prior to issuing a permit for portable registration, the SJVAPCD will conduct an on-site inspection of the unit. There are several notification and reporting rules associated with portable equipment. Namely, Section 6.1 states that if a portable emissions unit remains at a location for more than 24 hours, the SJVAPCD must be notified within two calendar days, and Section 6.2 states that within 30 days after the end of every calendar quarter, the SJVAPCD must be provided with the level of activity (hours of operation) for the previous quarter, unless the equipment is a rental. Finally, Section 8.0 provides emissions limitation (the total NO_X, or VOCs emissions from a project shall not exceed 100 pounds during any one day, for each pollutant, and the total PM_{10} emissions from a project shall not exceed 150 pounds during any one day) and minimum distance requirements of 1,000 feet from kindergar^{te}n to 12th grade schools. The actual emissions from the unit, when operated as a registered portable emissions unit, as verified by recordkeeping as prescribed by this rule, shall not exceed 10 tons per year of any affected pollutant when operated in any participating district.

Rule 2410 (Prevention of Signification Deterioration) - Rule 2410 is triggered when obtaining construction permits for a new major stationary source and/or major modification to existing major stationary sources located in areas classified as “in attainment” or in areas that are unclassifiable for any criteria pollutant. The most important of the “Requirements” in Section 4.0 of Rule 2410 is that of Subsection 4.1 requiring that a Prevention of Significant Deterioration (PSD) permit be obtained prior to beginning any construction of a new major stationary source or a major modification to an existing major stationary source. Lastly, the SJVAPCD must follow the public notice requirements of Rule 2201 prior to issuing a federal PSD permit.

Rule 2520 (Federally Mandated Operating Permits) provides an administrative mechanism for issuing operating permits for new and modified sources of air contaminants in accordance with requirements of 40 CFR Part 70 (State Operating Permit Programs). Amended on August 15, 2019, this rule applies to major sources of air toxics, stationary sources with the potential to emit 100 tons per year or more of any air contaminant, a source that EPA determines is required to obtain a Part 70 permit upon promulgation of a standard issued pursuant to Section 111 or 112 of the CAA, sources required by the PSD program to have a preconstruction review, solid waste incinerators subject to Sections 111 or 129 of the CAA, and any source in a source category designated by the EPA pursuant to 40 CFR Part 70.3.

Rule 2540 (Acid Rain Program) incorporates the Acid Rain Standards from Part 72, Title 40 CFR and is applicable to all stationary sources subject to Part 72, Title 40, CFR.

Rule 2550 (Federally Mandated Preconstruction Review for Major Sources of Air Toxics) applies to applications to construct or reconstruct a major air toxics source with an ATC issued on or after June 28, 1998. Section 5.0 of Rule 2550 requires the application of toxic best available control technology to new major air toxic sources and sources with the potential to emit in excess of a major air toxic source threshold. Section 6.1 requires an application for ATC for major air toxic sources subject to the requirements of SJVAPCD Rule 2201.

Regulation III (Fees)

Regulation III sets the fees associated with owning and operating facilities, activities, and equipment that have the potential to emit air pollutants in the SJV. This rule was last amended on July 1, 2019.

Regulation IV (Prohibitions)

Rule 4001 (New Source Performance Standards) applies to all new sources of air pollution and modifications of existing sources of air pollution within the source categories for which EPA has adopted standards. Section 4.0, Requirements, of Rule 4001 lists all of the provisions of 40 CFR Part 60 that are incorporated into the NSPS.

Rule 4002 (National Emission Standards for Hazardous Air Pollutants). In the event that any portion of an existing building will be renovated, partially demolished, or removed, the Project will be subject to SJVAPCD Rule 4002. Prior to any demolition activity, an asbestos survey of existing structures on the Project site may be required to identify the presence of any asbestos-containing building material (ACBM). Any identified ACBM having the potential for disturbance must be removed by a certified asbestos contractor in accordance with California Occupational Safety and Health Administration (Cal/OSHA) requirements.

Rule 4101 (Visible Emissions) prohibits the emission of visible air contaminants into the atmosphere and applies to any source operation with the potential to emit air contaminants. Sections 4.0 to 4.12 list the following exemptions: fires set by a permitted public officer (such as those for the instruction of fighting fire), orchard or citrus grove heater that produces less than one gram per minute unconsumed solid carbonaceous matter, hazard reduction burning, aircraft distribution of agricultural aids over lands devoted to agriculture, open outdoor fires used for cooking and/or recreation, emissions from equipment used for the instruction/certification of individuals in visible emissions, wet plumes where the presence of uncombined water is the only reason for the failure of an emission to meet rule limitations, emissions from maritime vessels using steam boilers during emergency boiler shutdowns for safety reasons, the use of an obscurant for the purpose of training military personnel and the testing of military equipment by the U.S. Department of Defense, and emissions specifically exempt from Regulation VIII. Sections 5.0 to 5.2 require that there be no discharge from a single source of emission for a period or periods aggregating more than 3 minutes in any 1 hour that is as dark or darker than a designated Ringelmann No. 1 rating by the U.S. Bureau of Mines, or of opacity that can obscure an observers view equal to or greater than the Ringelmann No. 1 rating.

Rule 4102 (Nuisance) applies to any source operation that emits or may emit air contaminants or other materials. In the event that the Project or construction of the Project creates a public nuisance, it could be in violation and be subject to SJVAPCD enforcement action.

Rule 4201 (Particulate Matter Concentration) sets a standard maximum of 0.1 grain per cubic foot of gas at dry standard conditions for PM emissions. This rule applies to any source operation that emits dust, fumes, or total suspended PM.

Rule 4202 (Particulate Matter – Emission Rate) establishes allowable emissions rates for PM. This rule requires any source operation that may emit PM emissions to meet the standards set forth in the table "Allowable Emission Rate Base on Process Weight Rate."

Rule 4651 (Soil Decontamination Operations) limits the emissions of VOCs from soil that has been contaminated with a VOC-containing liquid and applies to operations involving the excavation, transportation, handling, decontamination, and disposal of contaminated soil. Exempt from this rule is the excavation, handling, transportation, and decontamination of less than 1 cubic yard of contaminated soil per occurrence, operations related to the accidental spillage of 5 gallons or less of VOC-containing liquid per occurrence, contaminated soil exposed for the sole purpose of sampling, and soil contaminated solely by a known VOC-containing liquid or petroleum liquid that has an initial boiling point of 320°F. Rule requirements in Section 5.0 of this rule span written notices, monitoring, handling, storage, transportation, and decontamination.

Regulation V (Procedure Before the Hearing Board)

Regulation V (Procedure Before the Hearing Board) establishes the procedures in which an owner/operator can approach the Hearing Board to file petitions for variances from regulations.

Regulation VI (Air Pollution Emergency Contingency Plan)

Regulation VI (Air Pollution Emergency Contingency Plan) establishes a plan of action to be taken to prevent air pollutant concentration from reaching levels that could endanger the public health or to abate such concentrations should they occur.

Regulation VII (Toxic Air Pollutants)

Rule 7050 (Asbestos - Containing Material for Surfacing Applications). The purpose of this rule is to control airborne emissions of asbestos-containing rock. Compliance schedule, recordkeeping, and test methods are specified. This rule incorporates provisions of the CCR Section 93106.

Regulation VIII (Fugitive PM_{10} Prohibitions)

Regulation VIII (Fugitive PM_{10} Prohibitions) is a series of rules to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce, or mitigate anthropogenic fugitive dust emissions.

Rule 8021 (Construction, Demolition Excavation, Extraction, and Other Earthmoving Activities) limits fugitive dust emissions from construction, demolition, excavation, extraction, and

other earthmoving activities and applies to any construction, demolition, excavation, extraction, and other earthmoving activities, including, but not limited to, land clearing, grubbing, scraping, travel on site, and travel on access roads to and from the site.

Rule 8031 (Bulk Materials) limits fugitive dust emissions from the outdoor handling, storage, and transport of bulk materials and applies to the outdoor handling, storage, and transport of any bulk material.

Rule 8041 (Carryout and Trackout) prevents or limits fugitive dust emissions from carryout and trackout and applies to all sites that are subject to any of the following rules where carryout or trackout has occurred or may occur on paved public roads or the paved shoulders of a paved public road.

Rule 8051 (Open Areas) limits fugitive dust emissions from open areas and applies to any open area having 0.5 acre or more within urban areas, or 3.0 acres or more within rural areas; and contains at least 1,000 square feet of disturbed surface area.

Rule 8061 (Paved and Unpaved Roads) limits fugitive dust emissions from paved and unpaved roads by implementing control measures and design criteria.

Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas) limits fugitive dust emissions from unpaved vehicle and equipment traffic areas.

Regulation IX (Mobile and Indirect Sources)

Rule 9410 (Employer-Based Trip Reduction) reduces vehicle miles traveled from private vehicles used by employees to commute to and from their worksites to reduce emissions of NO_X, VOC, and PM.

Rule 9510 (Indirect Source Review). Indirect sources are land uses that attract or generate motor vehicles trips. Indirect source emissions contain many pollutants, principally PM_{10}, ROG, and NO_X. The San Joaquin Valley Air Pollution Control District (SJVAPCD) first implemented this requirement in the adopted 2003 PM_{10} Plan to develop and implement an Indirect Source Rule (ISR) by July 2004, with implementation to begin in 2005. Senate Bill 709 (SB 709) as required the SJVUAPCD to adopt by regulation a schedule of fees to be assessed on areawide and indirect sources of emissions. After public hearings, the Air District adopted Rule 9510 on December 15, 2005, and it became effective in 2006. This rule was amended on December 21, 2017, and the amendments came into effect on March 21, 2018.

The purpose of Rule 9510 is to reduce emissions of NO_X and PM_{10} from new development projects. The District determined that reducing one precursor NO_X, would reduce the cumulative impact on ozone form new development to less than significant levels. Sufficient ROG was obtained from other control measures to enable the District to predict attainment without additional ROG controls. The rule applies to development projects that seek to gain a discretionary approval for projects that, upon full buildout, will include any one of the following: 50 residential units; 2,000 square feet of commercial space; 25,000 square feet of light industrial space; 20,000

square feet of medical or recreational space; 39,000 square feet of general office space; 100,000 square feet of heavy industrial space; 9,000 square feet of educational space; 10,000 square feet of government space; or 9,000 square feet of any land use not identified above. Several sources are exempt from the rule, including transportation projects, transit projects, reconstruction projects that result from a natural disaster, and development projects whose primary source of emissions are subject to district Rules 2201 and 2010, which address stationary sources. Any development project that has a mitigated baseline of less than 2 tons per year for each NO_X and PM_{10} is exempted from the mitigation requirements of the rule as well as oil and gas activities (which involve development projects on facilities whose primary functions are subject to Rule 2201 [New and Modified Stationary Source Review Rule] or Rule 2010 [Permits Required]). Developers are encouraged to reduce as much air pollution as possible through on-site mitigation or incorporating 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, then 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 of such projects include retirement and crushing of gross polluting cars, replacement of older diesel engines, and diesel-powered vehicles and programs that would encourage the replacement of gas-powered lawn mowers with electric lawn mowers.

The ISR requires developers to reduce 20 percent of construction-exhaust NO_X, 45 percent of construction-exhaust PM_{10}, 33 percent of operational NO_X over 10 years, and 50 percent of operational PM_{10} over 10 years. The District estimates that the potential reductions from this program in 2010 at 11.5 tons per day, or 4,197.5 tons per year, of PM_{10} and 4.1 tons per day, or 1,496.5 tons per year, of NO_X.

Emission Reduction Agreements

The implementation, as mitigation, of a Development Mitigation Contract or Voluntary Emission Reduction Agreement (VERA) to reduce criteria pollutants of NO_X, ROGs, and PM net incremental emissions generated by a project has been incorporated into development projects in Kern County since 2008. They are not a "voluntary" agreement with the SJVAPCD but are mandated by enforceable mitigation measures and are, therefore, called Development Mitigation Contracts (DMC). The emission reductions required by a DMC are implemented within the SJVAB in quantities sufficient to fully mitigate the project's air quality impacts such that development of the project could be considered to result in no net increase in the designated criteria pollutant emissions over the criteria pollutant emissions that would otherwise exist without the development of the project, all to be verified by the SJVAPCD. Thus, the DMC results in greater reductions than would otherwise occur under the District's ISR, since the ISR does not require ROG reductions and the ISR only requires a percentage of reductions rather than full reductions of NO_X and PM resulting from project construction and operations. When adopting the ISR and the subsequent VERA/DMC programs, the District acknowledges that as ROG is a precursor to ozone, the reductions are not required in the ISR. In the VERA/DMC, the reductions are achieved by increasing the NO_X and PM tonnage for project levels (SJVAPCD 2005). As the

actual amount of ROG reductions achieved from NO_X and PM reductions is not absolutely certain, project emissions are still considered significant and unavoidable; however, all feasible and reasonable mitigation has been required to reduce criteria pollutants as close to "no net increase" as scientifically possible. This approach has been found legally sufficient by court rulings in the following cases; California Building Industry Assn. v. San Joaquin Valley APCD, Fresno County Case No. 06 CECG 02100 DS13. National Association of Home Builders v. San Joaquin Valley Unified Air Pollution Control District; Federal District Court, Eastern District of California, Case No. 1:07-CV-00820-LJO-DLB; and Center for Biological Diversity et al. v Kern County, Fifth Appellate District, Case No. F061908.

Local Control Measures

The SJVAPCD requires all local governments within its eight-county jurisdiction to adopt resolutions as part of the Ozone Attainment Demonstration Plan that must be approved by EPA. The resolutions describe the reasonably available control measures that each jurisdiction will implement to reduce ozone-causing emissions into the air from transportation sources. Local jurisdictions are also required to adopt best available control technology measures to reduce particle emissions as part of the PM_{10} Area Attainment Demonstration Plan. This process is coordinated and assisted by regional transportation planning agencies, such as the Kern COG.

The Kern County Board of Supervisors adopted a resolution on March 12, 2002, that committed the County to implementing several measures to reduce ozone-causing emissions. Among the measures are cost incentives for road contractors to minimize land closures, transit-oriented land use planning, and measures to encourage County employees and other motorists to restrict driving on days with high ozone levels as well as continuing efforts to convert County vehicles to low-emission compressed natural gas and gasoline/electric hybrid engines. Many of these measures have been incorporated as general plan policies.

The Kern County Board of Supervisors adopted a resolution on January 7, 2003, that committed the committed the County to implement several measures aimed at reducing PM_{10} emissions from County roadways. Among the measures are plans to determine the feasibility of paving the County's unpaved roads, which are lightly traveled; paving the shoulders of the most heavily traveled paved County roads as funding allows; and purchasing two PM_{10}-compliant street sweepers as funding allows. The resolution also committed the County to imposing tougher rules for canceling road improvements on large rural parcels; requiring public and private access roads for new commercial and industrial development to be paved; evaluating the adverse air quality impacts of new development and, where appropriate, requiring mitigation measures; implementing policies that require developers to control and abate dust during grading and construction operations; and to receive a permit for expansion or a significantly altered use, requiring unpaved parking and storage areas of commercial and agricultural operations in county areas to be paved. These measures are being implemented through the Kern County Land Division Ordinance, Kern County Zoning Ordinance (Zoning Ordinance), and in the approved General Plan.

Air Quality Plans

The SJVAPCD has developed plans to attain State and federal standards for ozone and PM. The District's air quality plans include emissions inventories to identify the sources and quantities of air pollutants, to evaluate how well different control methods have worked, and to demonstrate how air pollution will be reduced. The plans also use computer modeling to estimate future levels of pollution and make sure that the Valley will meet air quality goals. The SJVAPCD's attainment plans are subject to approval by the SJVAPCD's Governing Board. At the time of this writing, the following attainment plans were in effect.

The adopted plans include emissions inventories, projected changes in population, vehicles, fuels and equipment, and associated emissions. The plans then identify existing rules and additional proposed measures required to reduce emissions to the ambient air quality standards. These rules and proposed measures include requirements to obtain permits to construct and operate, and rules regulating the allowable emissions from various activities or classes of equipment.

One-Hour Ozone Plan

CARB submitted the 2004 Extreme Ozone Attainment Demonstration Plan to the EPA on November 15, 2004. The plan was amended by the District in 2008. Effective June 15, 2005, the EPA revoked the federal 1-hour ozone ambient air quality standard, finding that the 8-hour ozone standard was more health protective and adopted anti-backsliding provisions to preserve existing 1-hour ozone control measure and emissions reductions obligations; this delayed EPA action on the District's 2004 Plan until 2010. The SJVAPCD implemented the 2004 plan's control measures and emissions reductions strategies, and the Valley must still attain the revoked standard before it can rescind the CAA Section 185 fees collected under Rule 3170.

In 2012, the EPA withdrew its 2010 approval of the SJVAPCD's 2004 Plan and required submittal of a new plan for the revoked 1-hour standard that includes the following:

- A Rate of Progress demonstration
- Contingency measures for Rate of Progress and for attainment
- An attainment demonstration
- A demonstration for Reasonably Available Control Measures
- A demonstration for clean fuels/clean technologies are in place for boilers
- A vehicle miles traveled offset demonstration

The SJVAPCD's Governing Board adopted the 2013 Plan for the Revoked 1-Hour Ozone Standard in September 2013, thereby fulfilling air quality planning requirements under the federal CAA for the Revoked 1-Hour Ozone Standard. The District Governing Board also requested the EPA to set 2017 as the attainment date for the revoked 1-hour ozone NAAQS, adopted in 1979.

On July 13, 2015, the SJVAPCD submitted a second formal request that the EPA determine that the Valley has attained the federal 1-hour ozone standard, allowing nonattainment penalties to be lifted under federal CAA Section 179B.

On July 18, 2016, the EPA published in the Federal Register a final action determining that the SJV has attained the 1-hour ozone NAAQS. This determination was based on the most recent three-year period (2012 to 2014) of sufficient, quality-assured, and certified data (SJVAPCD n.d.[a]).

Eight-Hour Ozone Plan

In June 2016, the District adopted the 2016 Plan, addressing the federal mandates related to the 2008 8-hour ozone NAAQS. The 2016 Ozone Plan sets out the strategy to attain the 75 parts per billion (ppb) standard by 2031, ensuring expeditious attainment of the CAA. This requires another 207.7 tons per day in NO_X reductions from stationary and mobile sources throughout the SJV. The measures identified in this plan were designed to achieve the necessary reductions (SJVAPCD 2016).

CARB approved the plan on July 21, 2016. In response to court decisions, some elements included in the 2016 Ozone Plan required updates. CARB staff prepared the 2018 Updates to the California SIP (2018 SIP Update) to update SIP elements for nonattainment areas throughout the State as needed. CARB adopted the 2018 SIP Update on October 25, 2018 (CARB 2019). In December 2022, the District adopted the 2022 Plan, addressing the federal mandates related to the 2008 8-hour ozone NAAQS. The 2022 Ozone Plan sets out the strategy to attain the 75 ppb standard by 2037 (SJVACPD 2016b). The plan has been submitted to CARB for approval.

PM_{10} Maintenance Plan

Based on PM_{10} measurements from 2003 to 2006, the EPA found that the SJVAB has reached federal PM_{10} standards. On September 21, 2007, the SJVAPCD adopted the 2007 PM_{10} Maintenance Plan and Request for Redesignation. This plan demonstrates that the Valley will continue to meet the PM_{10} standard. The EPA approved the document and on September 25, 2008, the SJVAB was redesignated to attainment for PM_{10} NAAQS.

2008 $PM_{2.5}$ Plan

The SJVAB is designated nonattainment for federal $PM_{2.5}$ standards. The EPA set their first $PM_{2.5}$ standards in 1997, and they strengthened the 24-hour standard in 2006. The SJVAPCD's Governing Board adopted the 2008 $PM_{2.5}$ Plan on April 30, 2008. The plan estimated that the SJVAB would reach the $PM_{2.5}$ standard by 2014. CARB approved the Plan on May 22, 2008. The EPA approved most provisions of the 2008 $PM_{2.5}$ Plan effective January 9, 2012.

2012 $PM_{2.5}$ Plan

The SJVAPCD adopted the 2012 $PM_{2.5}$ Plan on December 20, 2012. The plan demonstrated that the SJVAB would achieve the 2006 24-hour $PM_{2.5}$ NAAQS of 35 micrograms per cubic meter ($\mu g/m^3$) by 2019. CARB approved the SJVAPCD's 2012 $PM_{2.5}$ Plan in January 2013. The EPA approved most provisions of the 2012 $PM_{2.5}$ Plan effective August 31, 2016.

2015 $PM_{2.5}$ Plan

The SJVAPCD adopted the 2015 $PM_{2.5}$ Plan for the 1997 $PM_{2.5}$ standard in April 2015. While nearly achieving the 1997 standards by 2014, as predicted in the 2008 $PM_{2.5}$ Plan, the SJVAB experienced higher $PM_{2.5}$ levels in winter 2013 to 2014 due to the extreme drought, stagnation, strong inversions, and historically dry conditions; thus, the SJVAB was unable to meet the attainment date of December 31, 2015. Accordingly, the plan asked for a one-time extension of the attainment deadline for the 24-hour standard to 2018 and the annual standard to 2020.

The 2015 $PM_{2.5}$ Plan builds on past development and implementation of effective control strategies and, consistent with EPA regulations for $PM_{2.5}$, planned to achieve the 1997 standard as expeditiously as possible. The plan contains Most Stringent Measures, Best Available Control Measures, and additional enforceable commitments to further reduce emissions to ensure expeditious attainment of the 1997 standard.

The EPA formally proposed to approve portions of the 2015 $PM_{2.5}$ Plan and the attainment date extension on February 9, 2016. The EPA needed to finalize its approval of the SJVAPCD's attainment date extension by July 2016, but the EPA failed to finalize this action. The EPA subsequently denied the SJVAPCD's attainment extension request on the basis that they did not have enough information to act and found that the SJVAPCD failed to attain the 1997 standard by its December 2015 attainment deadline. The EPA's action was effective December 23, 2016.

2016 Moderate Area Plan for the 2012 $PM_{2.5}$ Standard

The SJVAPCD adopted the 2016 Moderate Area Plan for the 2012 $PM_{2.5}$ Standard on September 15, 2016. This plan addresses the EPA federal annual $PM_{2.5}$ standard of 12 $\mu g/m^3$, established in 2012. This plan includes an attainment impracticability demonstration and request for reclassification of the SJVAB from moderate nonattainment to serious nonattainment.

2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards

The SJVAPCD adopted the 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards on November 15, 2018. This plan addresses the EPA federal 1997 annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ and 24-hour $PM_{2.5}$ standard of 65 $\mu g/m^3$; the 2006 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$; and the 2012 annual $PM_{2.5}$ standard of 12 $\mu g/m^3$. The plan demonstrates attainment of the $PM_{2.5}$ standards, as expeditiously as possible, with estimates that the EPA federal 1997 annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ and 24-hour $PM_{2.5}$ standard of 65 $\mu g/m^3$ will be attained by 2020, the 2006 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$ will be attained by 2024, and the 2012 annual $PM_{2.5}$ standard of 12 $\mu g/m^3$ will be attained by 2025. CARB approved the SJVAPCD's 2018 $PM_{2.5}$ Plan in January 2019. The Plan is currently being considered for approval by the EPA.

The SJVAPCD attainment strategy builds on comprehensive strategies already in place from previously adopted attainment plans and measures. The SJVAPCD's multifaceted approach to reducing emissions in the SJVAB for this Plan consists of a combination of innovative regulatory and non-regulatory measures (SJVAPCD 2018).

As of 2016, the SJVAPCD's Bakersfield, Visalia, Fresno, and Stockton $PM_{2.5}$ monitoring sites have all achieved the EPA 24-hour $PM_{2.5}$ standard of 65 µg/m³ (CARB 2019). However, as explained in Table 4.3-2, the SJVAPCD remains nonattainment for $PM_{2.5}$ and further reductions are needed to meet the federal 1997 annual $PM_{2.5}$ standard of 15 µg/m³, the 2006 24-hour $PM_{2.5}$ standard of 35 µg/m³ and the 2012 annual $PM_{2.5}$ standard of 12 µg/m³.

Air Quality Conformity Determination for Transportation Plans and Programs

The CAA amendments of 1990 require a finding to be made stating that any project, program, or plan subject to approval by a metropolitan planning organization conforms to air plans for attainment of air quality standards. Kern COG is designated the Regional Transportation Planning Agency and Metropolitan Planning Organization for Kern County. In that capacity, Kern COG models air quality projections on population projections in conjunction with current general plan designations and estimated vehicle miles as well as the current Regional Transportation Plan (RTP) and the federal transportation plan for Kern County finalized in 2022. Kern County is contained within two air basins: the SJVAB and the MDAB. Each air basin has its own plans and pollutant budgets. Kern COG makes conformity findings for each air basin. The Federal Transportation Improvement Program (FTIP) for the Kern County region is a six-year schedule of multimodal transportation improvements, and the RTP is a long-range, 24-year transportation and sustainability plan.

The Conformity Analysis for the 2023 FTIP and 2022 RTP was adopted by Kern COG November 16, 2022, and approved by the Federal Highway Administration and the Federal Transit Administration on December 16, 2022. The regional emissions analysis was conducted for years ranging from 2022 to 2046 for analysis years applicable to each pollutant. The conformity findings conclude that the FTIP and RTP result in emissions that are less than the emission budgets of baseline emissions or approved trading mechanisms for transportation conformity purposes for CO, VOC, NO_X, $PM_{10,}$ and $PM_{2.5}$ (FHWA 2022).

Guide for Assessing and Mitigating Air Quality Impacts/Air Quality Thresholds of Significance

In August 1998, the SJVAPCD adopted its Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI) to provide lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The District subsequently revised its GAMAQI document in January 2002 (SJVAPCD 2002). In 2012, the SJVAPCD began the process to update its GAMAQI document. The update was intended to codify long-standing district practices, provide updated data, revise recommended significance thresholds, and provide additional technical guidance. The May 2012 Draft GAMAQI is more environmentally protective than the January 2002 GAMAQI. In March 2015, the SJVAPCD again updated the GAMAQI. This document utilizes the significance thresholds recommended in its March 2015 Final GAMAQI (SJVAPCD 2015).

In December 2006, the Kern County Planning and Natural Resources (KCPNR) issued its own Guidelines for Preparing an Air Quality Assessment for Use in Environmental Impact Reports (Kern County Air Quality Assessment Guidelines). The document provided specific guidance for

County-prepared environmental impact reports, including air quality issues to be considered, analytical approaches and resources, a significance threshold for PM_{10} (which was not reflected in the January 2002 GAMAQI, but is included in the March 2015 Final GAMAQI), and a cumulative impact analysis methodology (KCPD 2006). This analysis also utilizes the analytical approach and issues recommended in the KCPNR's Guidelines.

Criteria Pollutant Emissions

Table 4.3-6 presents the SJVAPCD's criteria pollutant emissions significance thresholds for construction and project operation, based on the District's Final March 2015 GAMAQI. As shown in Table 4.3-6, the SJVAPCD recommends that emissions from permitted sources and activities be evaluated separately from non-permitted sources and activities.

Table 4.3-6: Criteria Pollutant Emissions Significance Thresholds (tons per year)

Pollutant/ Precursor	Construction Emissions	Operational Emissions	
		Permitted Sources and Activities	Non-Permitted Sources and Activities
ROG	10	10	10
NO_X	10	10	10
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15
CO	100	100	100
SO_X	27	27	27

Source: SJVAPCD 2015, Section 8.3.
Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
ROG = reactive organic gases
SO_X = sulfur oxides

As indicated in the 2015 GAMAQI, permitted sources and activities are subject to SJVAPCD Regulation II (Permits), notably Rule 2201 (New and Modified Stationary Source Review) and Rule 2301 (Emission Reduction Credit Banking). Rule 2201 requires that any emission increases from new permitted stationary sources are mitigated by emission trade-offs, which can include Emission Reduction Credits (ERCs), emission reductions due to control measures, or other decreases in emissions at a facility site (such as shutting down other equipment). In most cases, permitted stationary source emissions, therefore, will be reduced or mitigated to below the SJVAPCD's recommended significance thresholds (SJVAPCD 2015, Section 8.2.1).

While CARB recently performed an audit of the SJVAPCD ERC Banking Program, CARB did not overturn the program (CARB 2020a, 2020b). Subsequently, the SJVAPCD Board approved staff

recommendations to remove Ag-ICE projects from the NO_X ERC equivalency system and to remove orphan shutdown projects from the VOC ERC equivalency system, effective September 17, 2020 (SJVAPCD 2020). This action means that the SJVAPCD cannot demonstrate federal equivalency with the surplus value test for NO_X and VOC and thus any new major source or federal major modification triggering NO_X or VOC offsets under Rule 2201 will require "surplus at time of use" ERCs, which means ERCs must be demonstrated to be surplus at the time an ATC is issued, rather than when the emission reductions began. This process will remain in place until such time that equivalency with the federal program is again demonstrated by the SJVAPCD. This step by the SJVAPCD thus restricts the allowable number of ERCs that are valid for use as offsets in the Valley but does not change the way that ERCs are used, nor does it change permitting requirements under Rule 2201. Thus, permitted stationary sources will only be allowed to move forward and be permitted by the SJVAPCD if emissions are properly offset and if the SJVAPCD approves an ATC, as required by Rule 2201. Therefore, it is reasonable to assume that permitted stationary source emissions will continue to be offset under SJVAPCD rules and reduced or mitigated to below SJVAPCD's recommended significance thresholds.

Odors

The SJVAPCD recommends that lead agencies assess odor significance based on a review of District complaint records. For a project locating near an existing source of odors, the impact is potentially significant when the project site is at least as close as any other site that has already experienced significant odor problems related to the odor source. Significant odor problems are defined as:

- More than one confirmed complaint per year averaged over a three-year period; or
- Three unconfirmed complaints per year averaged over a three-year period.

A complaint is deemed unconfirmed if the odor/air contaminant release could not be detected, or the source/facility cannot be determined.

The Kern County Air Quality Assessment Guidelines recommend dispersion modeling of maximum 24–hour average concentrations of odorous compounds at the project boundary and within a 6-mile limit to determine ambient concentrations at nearby sensitive receptors (e.g., residences and schools), including approved, but not constructed sensitive receptors. Ambient concentrations at such receptors should be compared to odor thresholds and CEQA impact thresholds to determine potential odor impacts.

Air Toxic Program

In the context of TACs, to meet the requirements of federal and State law, the SJVAPCD has created an Integrated Air Toxic Program. This program serves as a tool for implementation of the requirements outlined in Title III of the 1990 CAA Amendments and the TAC-related requirements of State law and District regulations. The goals of SJVAPCD risk management efforts are to: (1) minimize increases in toxic emissions associated with new and modified sources of air pollution;

and (2) ensure that new and modified sources of air pollution do not pose unacceptable health risks at nearby residences and businesses.

To achieve these goals, the SJVAPCD reviews the risk associated with each permitting action where there is an increase in emissions of TACs. SJVAPCD staff, as part of the engineering evaluation for these projects, performs this risk management review. The risk management review is performed concurrently with other project review functions necessary to process permit applications with the SJVAPCD.

Under the Agency's risk management policy, toxic best available control technology must be applied to all units that, based on their potential emissions may pose greater than de minimis risks. Facilities that pose health risks above SJVAPCD action levels are required to submit plans to reduce their risk. Action levels for risk were established in the SJVAPCD's Board-Approved Health-Risk Reduction Strategy (HRRS). The action level for cancer risk was 10 cases per 1 million exposed persons, based on the maximum exposure beyond facility boundaries at a residence or business. Following changes to the State Health Risk Assessment (HRA) Guidelines (discussed in Impact 4.3-4), the SJVAPCD changed its cancer risk action level to 20 per 1 million in a policy dated May 28, 2015 (APR-1906 "Framework for Performing Health Risk Assessments"). The action level for non-cancer risk is a hazard index of 1.0 at any point beyond the facility boundary where a person could reasonably experience exposure to such risk.

SJVAPCD Health-Risk Reduction Strategy

In 2010, the SJVAPCD Governing Board adopted the Risk-Based Strategy, which focuses on measures that address the pollutants for which the Valley is working toward attainment: ozone and fine PM. This strategy is also gaining widespread support by the EPA and the scientific community. In May 2013, the SJVAPCD renamed its Risk-Based Strategy as the HRRS.

Driven by a rapidly expanding body of scientific research, there is now a growing recognition within the scientific community that from an exposure perspective, the NAAQS metrics for progress are a necessary, but increasingly insufficient, measure of total public health risk associated with air pollutants. In particular, control strategies for sources of $PM_{2.5}$ and ozone do not necessarily account for qualitative differences in the nature of their emissions. For $PM_{2.5}$, toxicity has been shown to vary depending on particle size, chemical species, and surface area. In the case of ozone, differences in the relative potency of ozone precursors, VOCs in particular, is not captured by a strict, mass-based approach to precursor controls. Thus, while the NAAQS and SIP process is motivated by public health, the process set forward under the CAA does not guarantee that the public health benefits of control strategies will be maximized.

The HRRS applies to regulatory, incentive, and outreach strategies and recognizes that risk to the public is not always proportional to the mass rate of emissions based on factors such as:

- Ultrafine particles versus coarse particles;
- Toxicity/carcinogens;
- Intake fraction/deposition fraction;
- NO_X versus VOCs;
- NO_X versus ammonia reductions; and
- Photochemical reactivity of VOCs.

The HRRS does not establish a new acceptable risk level, delay attainment of mass-based air quality standards, or ask for a change in the form of the mass-based air quality standards. Instead, it describes how to determine the potential risk to public health from a particular project.

SJVAPCD Policy APR 1905

In Policy APR 1905, the SJVAPCD establishes three stages for risk evaluation for all projects resulting in increases in hourly, daily, or annual potential to emit hazardous air pollutants from new and modified sources, except projects specifically exempted in approved SJVAPCD permitting policies. The stages are the following:

A. Prioritization

projects shall be prioritized using the California Air Pollution Control Officers Association Facility Prioritization Guidelines. A prioritization score is used for determining the applicability of toxic best available control technology to each new and modified emissions units and the need for a detailed HRA.

B. Health Risk Assessment

Projects with cumulative increases in prioritization score of greater than one require an HRA using the OEHHA Guidelines.

C. Calculation of Increase in Permitted Emissions

Increase is determined as the difference between the baseline and proposed Potential to Emit for the pollutant. APR 1905 specifies that the SJVAPCD policy defining certain small increases of criteria pollutant emissions as zero does not apply to hazardous air pollutants.

Kern County General Plan

The project area is located within the Kern County General Plan (KCGP) area and, therefore, would be subject to applicable policies and measures of the KCGP. The Land Use, Conservation, and Open Space Element; Safety Element; and the Energy Element of the KCGP include goals, policies, and implementation measures related to air quality that apply to the project, as described below.

Chapter 1. Land Use, Conservation, and Open Space Element

1.10.2. Air Quality

Policies

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 CEQA.

Policy 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 21. The County shall support air districts' efforts to reduce PM_{10} and $PM_{2.5}$ emissions.

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.

Policy 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.

Implementation Measures

Implementation Measure F. All discretionary permits shall be referred to the appropriate air district for review and comment.

Implementation Measure G. Discretionary development projects involving the use of tractor trailer rigs shall incorporate diesel exhaust reduction strategies including, but not limited to:

- Minimizing idling time.
- Electrical overnight plug-ins.

Implementation Measure H. Discretionary projects may use one or more of the following to reduce air quality effects:

- Pave dirt roads within the development.
- Pave outside storage areas.
- Use of alternative fuel fleet vehicles or hybrid vehicles.
- Use of emission control devices on diesel equipment.
- Other strategies that may be recommended by the local Air Pollution Control Districts.

Chapter 4. Safety Element

4.2. General Policies and Implementation Measure, which Apply to more than One Safety Constraint

Policies

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 oilfield areas, presently under way by various County departments, be continued.

Chapter 5. Energy Element

5.3.1. Urban/Residential Development in Petroleum Resource Areas

Policies

Policy 8. Reduce the public's exposure to fires, explosions, blowouts, and other hazards associated with the accidental release of crude oil, natural gas, or hydrogen sulfide gas by ensuring that discretionary development projects have adequate separation from oil and natural gas production land uses.

Chapter V. Conservation Element

E. Air Quality

Goals

Goal 1. Promote air quality that is compatible with health, well-being, and enjoyment of life by controlling point sources and minimizing vehicular trips to reduce air pollutants.

Goal 2. Continue working toward attainment of Federal, State and Local standards as enforced by the San Joaquin Valley Unified Air Pollution Control District.

Goal 3. Reduce the amount of vehicular emissions in the Planning Area.

Policies

Policy 1. Comply with and promote San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) control measures regarding Reactive Organic Gases (ROG). Such measures are focused on: (a) steam driven well vents, (b) Pseudo-cyclic wells, (c) natural gas processing plant fugitives, (d) heavy oil test signs, (e) light oil production fugitives, (f) refinery pumps and compressors, and (g) vehicle inspection and maintenance (I-1).

Policy 2. Encourage land uses and land use practices which do not contribute significantly to air quality degradation (I-1).

Policy 3. Require dust abatement measures during significant grading and construction operations (I-1).

Policy 5. Consider the location of sensitive receptors such as schools, hospitals, and housing developments when locating industrial uses to minimize the impact of industrial sources of air pollution (I-1).

4.3.4 Impacts and Mitigation Measures

Methodology

This section discusses the methodologies used to conduct the evaluation of air quality impacts for the project, including guidelines for preparing environmental documents under CEQA and technical methods employed in the evaluation. The air quality significance criteria were developed considering the CEQA significance criteria developed by the local air quality district in the project area, which is the SJVAPCD, approved CEQA air quality checklists, and considering other federal criteria.

The analysis presented within this section is based on qualitative and quantitative approaches for determining air quality impacts associated with construction, operation, and maintenance of the project. The baseline for purposes of this analysis is considered to be the physical environmental conditions existing as of the beginning of environmental analysis (2022). The change in the environment caused by the project results from construction and from operation of the amine carbon capture units.

Pollutant Emissions

The construction and operational emissions were estimated from several emissions models and associated spreadsheet calculations, depending on the source type and data availability. The primary emissions models used included CARB's on-road vehicle emission factor model

(EMFAC) version 2021 and the California Emissions Estimator Model (CalEEMod) version 2021.1.13. Construction and operational emissions were estimated using project-specific data and schedules within the models.

Construction Emissions

Construction emissions of the proposed project were estimated in CalEEMod based on construction schedules of 18 days per well, 2 years for the capture facilities, and 1 year for the pipelines. The CalEEMod equipment list was updated to reflect the list of proposed construction equipment and schedule that was provided by the project proponent. Applying model defaults as well as a conservative analysis approach, construction emissions were estimated as if construction started in January of 2024. The dates entered into the CalEEMod program may not represent the actual dates the equipment will operate; however, the total construction time is accurate, and therefore, all estimated emission totals are conservative and reflect a reasonable and legally sufficient estimate of potential impacts. All construction equipment activity assumption levels were based on the specified CalEEMod default values. Details of CalEEMod inputs and assumptions are included in the Air Quality Impact Analysis.

Mobile source emissions during construction were estimated using CARB's EMFAC model version EMFAC2021 based on anticipated daily trips from haul trucks during pipeline construction, vendor trips during well pad and well construction, and worker commutes during the entire construction period. Details of EMFAC2021 inputs and assumptions are included in the Air Quality Impact Analysis.

Operational Emissions

Mobile source emissions from worker commute vehicles during operations were estimated using EMFAC2021, assuming 10 new workers will be needed in addition to the existing 13 workers at the existing facility. The capture facilities (new amine unit valve) fugitive emissions have been quantified using the California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities, as described in the Air Quality Impact Analysis. Operations of the capture processes are assumed to be run by electric air compressors and pumps that do not generate air pollutant emissions.

GAMAQI recommends that lead agencies consider situations wherein a new or modified source of HAPs is proposed for a location near an existing residential area or other sensitive receptor when evaluating potential impacts related to HAPs. The proposed project would result in new HAP emissions of DPM from construction equipment exhaust, construction and operational commute vehicles, and operational fugitive VOC emissions from the new capture facilities. Therefore, an assessment of the potential risk to the population attributable to emissions of HAPs from the proposed project is required.

Health Risk Assessment

To predict the potential health risk to the population attributable to emissions of HAPs from the proposed project, ambient air concentrations were predicted with dispersion modeling to arrive at

a conservative estimate of increased individual carcinogenic risk that might occur as a result of continuous exposure over a 2-year construction timeline and a 68-year lifetime for operational exposure. Health risk was determined using EPA's AERMOD dispersion model, CARB's Hotspots Analysis Reporting Program (HARP2), following guidance from the California EPA OEHHA, as detailed in the Air Quality Impact Analysis.

Thresholds of Significance

The CEQA Appendix G Checklist and the Kern County adopted CEQA thresholds state that a project would have a significant air quality impact if it would:

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

  Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard. Specifically, implementation of the project would have a significant impact on air quality if it would exceed any of the thresholds adopted by the San Joaquin Valley Unified Air Pollution Control District, as summarized in Table 4.3-7.

Table 4.3-7: San Joaquin Valley Air Pollution Control District Criteria Pollutant Emissions Significance Thresholds (tons per year)

Pollutant/ Precursor	Construction Emissions	Operational Emissions	
		Permitted Sources and Activities	Non-Permitted Sources and Activities
ROG	10	10	10
NO_X	10	10	10
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15
CO	100	100	100
SO_X	27	27	27

Source: SJVAPCD 2015, Section 8.3.
Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
ROG = reactive organic gases
SO_XS = sulfur oxides

Project Impacts

Impact 4.3-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan

The air pollution control districts and air quality management districts have the primary responsibility for controlling emissions from sources other than locomotives, motor vehicles and other specified statewide sources (such as consumer products), which are the responsibility of CARB or the EPA. Air districts adopt and enforce rules and regulations to ensure that emissions comply with national, state, and local emission standards, and will not interfere with the attainment and maintenance of the state and federal ambient air quality standards. The project is located within the administrative boundaries of the SJVAPCD, which has jurisdiction over air quality in the SJVAB.

Activities that would be authorized under the project would result in emissions from on-road vehicular traffic from the operations and maintenance of the carbon capture and storage (CCS) facility. No new stationary sources of emissions are associated with project operation. Air pollutants would also be emitted during project construction (off-road construction equipment, on-road vehicles, and fugitive PM from material movement).

Consistency with Applicable Air Quality Plans

The SJVAPCD has developed plans to attain state and federal standards for ozone and PM. The District's air quality plans include emissions inventories to identify the sources and quantities of air pollutant emissions, evaluate how well different control methods have worked, and demonstrate how air pollution will be reduced. The plans also use computer modeling to estimate future levels of pollution to ensure that the Valley will meet air quality goals. As of June 2020, the following attainment/maintenance plans are in effect, as detailed in Section 4.3.3, *Regulatory Setting*, above.

Consistency with SJVAPCD Applicable Permits Required

SJVAPCD Rule 2010 (Permits Required) requires that an ATC Permit and a PTO be obtained prior to constructing, altering, replacing, or operating any device that emits or may emit air contaminants. SJVAPCD Rule 2410 (Prevention of Significant Deterioration) requires that preconstruction permits be obtained for new major stationary sources and major modifications to existing major stationary sources in areas classified as attainment or unclassifiable for any criteria pollutant. Since the project would not construct or modify an existing stationary source device, no ATC Permits, Permits to Operate, or PSD preconstruction permits would be required.

SJVAPCD Rule 2410 (Prevention of Significant Deterioration) requires that preconstruction permits be obtained for new major stationary sources and major modifications to existing major stationary sources in areas classified as attainment or unclassifiable for any criteria pollutant. A stationary source or a modification is considered major if the net emissions increase equals or exceeds 40 tons per year VOC, 40 tons per year NO_X, 15 tons per year PM_{10}, 10 tons per year $PM_{2.5}$, 100 tons per year CO, or 40 tons per year SO_2. Stationary source emissions increases associated

with the project would not exceed these thresholds. Therefore, a PSD preconstruction permit would not be required for the project.

Consistency with SJVAPCD Applicable Rules

Activities that would be authorized under this project would result in emissions from construction and on-road vehicular traffic from the construction and operations of the CCS facilities facility. Following is a list of the SJVAPCD rules that could potentially apply to construction and operation activities that would be authorized under this project.

Activities that would be authorized under this project would be required to comply with the relevant provisions of the following rules:

- Rule 2020 (Exemptions)
- Rule 3135 (Dust Control Plan Fee)
- Rule 4101 (Visible Emissions)
- Rule 4102 (Nuisance)
- Rule 4201 (Particulate Matter Concentration)
- Rule 4202 (Particulate Matter Emission Rate)
- Rule 4651 (Soil Decontamination Operations)
- 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)
- Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas)
- Rule 9510 (Indirect Source Review)

Consistency with Applicable Indirect Source Review

On December 15, 2005, the SJVAPCD Governing Board adopted Rule 9510 (Indirect Source Review, or ISR). The District's ISR rule is intended to reduce NO_X and PM_{10} emissions from new development projects. Rule 9510 requires developers of specified development projects to submit applications and reduce emissions through on-site mitigation, off-site SJVAPCD-administered projects, or a combination of the two.

Rule 9510 exempts nonresidential projects with contiguous or adjacent property under common ownership of a single entity in whole or in part, which is designated and zoned for the same development density land use and has the capability to accommodate development projects emitting more than 2.0 tons per year of operational NO_X or PM_{10}. The activities authorized under this project would not emit more than 2.0 tons of operational NO_X or PM_{10}. Therefore, the project is exempt from Rule 9510 under Section 4.4.3, more specifically under Section 4.4.3.9 (SJVAPCD 2005).

Permitted Source Emissions

Emission increases associated with activities authorized under this project would not be generated by stationary sources that would require SJVAPCD permits. Therefore, permitted source emissions would be consistent with the SJVAPCD's adopted regulatory program to attain state and federal ozone and PM standards.

Non-Permitted Source/Activity Emissions

Non-permitted sources and activities would be subject to the following federal and state regulatory programs that are incorporated within the attainment plans for state and federal ozone and PM standards:

- Heavy-duty engine and on-road vehicle standards enacted by CARB and the EPA (California Standards Codified at 13 CCR Section 1956.8).
- Light and medium on-road vehicle standards enacted by CARB (starting at 13 CCR Section 1900).

Non-permitted source/activity emissions were calculated using CARB's EMFAC2021 emissions model, which reflects adopted California on-road vehicle emission standards, and Version 2022.1.1.13 model to generate emissions from construction activities. Therefore, non-permitted source/activities would be consistent with adopted regulatory programs incorporated within the SJVAPCD's ozone and PM attainment plans.

Consistency with Kern County General Plan

CCS activities that would be authorized under the project would be required to comply with the policies and measures of the KCGP as discussed in greater detail in Section 4.11, *Land Use and Planning*, of this EIR.

In the absence of mitigation measures (MM) 4.3-1 through MM 4.3-4, activities that would be authorized under the project could potentially conflict with or obstruct implementation of the applicable air quality plan or potentially be inconsistent with the General Plan measures and, therefore, could be significant.

MM 4.3-1 through MM 4.3-4 have been included to provide consistency with the adopted General plan and applicable plans by the San Joaquin Air Pollution Control District.

Mitigation Measures

MM 4.3-1 Consistent with the requirements of the San Joaquin Valley Air Pollution Control District Regulation II-Permits, the Owner/operator shall obtain an Authority to Construct permit and a Permit to Operate for any facility or equipment requiring a permit from the San Joaquin Valley Air Pollution Control District, such as stationary sources required to obtain permits pursuant to District Rule 2010. All emissions increases from permitted equipment shall comply with District Rule 2201.

MM 4.3-2 The Owner/operator shall develop and implement a Fugitive Dust Control Plan in compliance with San Joaquin Valley Air Pollution Control District fugitive dust suppression regulations. The Fugitive Dust Control Plan shall include:

a. Name(s), address(es), and phone number(s) of person(s) responsible for the preparation, submission, and implementation of the plan.

b. Description and location of operation(s).

c. Listing of all fugitive dust emissions sources included in the operation.

d. The following dust control measures shall be implemented:

    1. All on-site unpaved roads shall be effectively stabilized using water or chemical soil stabilizers that can be determined to be as efficient as or more efficient for fugitive dust control than California Air Resources Board approved soil stabilizers, and that shall not increase any other environmental impacts including loss of vegetation.

    2. All material excavated or graded will be watered to prevent excessive dust. Watering will occur as needed with complete coverage of disturbed areas. The excavated soil piles will be watered as needed to limit dust emissions to less than 20% opacity or covered with temporary coverings.

    3. Construction activities that occur on unpaved surfaces will be discontinued during windy conditions when winds exceed 25 miles per hour and those activities cause visible dust plumes that exceed the SJVAPCD 20% opacity standard.

    4. Track-out debris onto public paved roads shall not extend 50 feet or more from an active operation and track-out shall be removed or isolated such as behind a locked gate at the conclusion of each workday, except on agricultural fields where speeds are limited to 15 mph.

    5. All hauling materials should be moist while being loaded into dump trucks.

6. All haul trucks hauling soil, sand, and other loose materials on public roads shall be covered (e.g., with tarps or other enclosures that would reduce fugitive dust emissions).
7. Soil loads should be kept below 6 inches or the freeboard of the truck.
8. Drop heights when loaders dump soil into trucks shall not exceed 5 feet above the truck.
9. Gate seals should be tight on dump trucks.
10. Traffic speeds on unpaved roads shall be limited to 25 miles per hour.
11. All grading activities shall be suspended when visible dust emissions exceed 20%.
12. Other fugitive dust control measures as necessary to comply with San Joaquin Valley Air Pollution Control District Rules and Regulations.
13. Disturbed areas shall not exceed those shown on the Site Plan.
14. Disturbed areas should be re-vegetated as soon as possible after disturbance if area is no longer needed for oil and gas activities.

MM 4.3-3 All off-road construction diesel engines not registered under California Air Resources Board's Statewide Portable Equipment Registration Program, which have a rating of 50 horsepower or more, shall meet, at a minimum, the Tier 3 California Emission Standards for Off-road Compression-Ignition Engines as specified in California Code of Regulations, Title 13, section 2423(b)(1) unless that such engine is not available for a particular item of equipment. In the event a Tier 3 engine is not available for any off-road engine larger than 100 horsepower, that engine shall be equipped with retrofit controls that would provide nitrogen oxides and particulate matter emissions that are equivalent to Tier 3 engine.

a. All equipment shall be turned off when not in use. Engine idling of all equipment shall be limited to five minutes, except under exemptions specified in California Code of Regulations Title 13 Section 2449(d)(2)(A).
b. All equipment engines shall be maintained in good operating condition and in proper tune per manufacturers' specifications.

MM 4.3-4 To further reduce emissions of oxides of nitrogen from on-road heavy-duty diesel haul vehicles:

a. 2007 engines or pre-2007 engines shall comply with California Air Resources Board retrofit requirements set forth in California Code of Regulations Title 13 Section 2025.

b. All on-road construction vehicles, except those meeting the 2007/California Air Resources Board-certified Level 3 diesel emissions controls, shall meet all applicable California on-road emission standards and shall be licensed in the State of California. This does not apply to worker personal vehicles.

c. All on-road construction vehicles shall be properly tuned and maintained in accordance with the manufacturers' specifications.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.3-2: Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant for Which the Project Region is Nonattainment under an Applicable Federal or State Ambient Air Quality Standard

The current nonattainment status of regional pollutants is determined by past development and present activities. The District's attainment plans are designed to ensure the future attainment of State and federal ambient air quality standards. Consequently, the District's application of thresholds of significance for emission of criteria pollutants determines whether a project's emissions would have a cumulatively considerable contribution of emissions of a criteria pollutant for which the District is nonattainment. If project emissions exceed the thresholds of significance for criteria pollutants the project would be expected to result in a considerable net increase of any criteria pollutant for which the District is in nonattainment under applicable federal or State ambient air quality standards. The SJV is in nonattainment for $PM_{2.5}$, PM_{10}, and ozone. Ozone is addressed by examining its precursors which are NO_X, VOC, and CO.

Per the SJVAPCD's March 2015 GAMAQI:

> "By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development. Future attainment of State and Federal ambient air quality standards is a function of successful implementation of the District's attainment plans. Consequently, the District's application of thresholds of significance for criteria pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality.
>
> A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program, including, but not limited to an air quality attainment or maintenance plan that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located [CCR §15064(h)(1)].

> Thus, if project-specific emissions would be less than the thresholds of significance for criteria pollutants, as a general matter the project would not be expected to result in a cumulatively considerable net increase of any criteria pollutant for which the District is in non-attainment under applicable federal or State ambient air quality standards." (SJVAPCD 2015, Section 7.14.)

The SJVAPCD March 2015 Draft GAMAQI also states,

> As discussed in Section 8.3.1 (Basis for Air Quality Thresholds of Significance), the District's thresholds of significance for criteria pollutants are based on District rule 2201 (New Source Review) offset requirements. Furthermore, New Source Review (NSR) is a major component of the District's attainment strategy. NSR provides mechanisms, including emission trade-offs, by which Authorities to Construct such sources may be granted, without interfering with the attainment or maintenance of Ambient Air Quality Standards. District implementation of NSR ensures that there is no net increase in emissions above specified thresholds from new and modified Stationary Sources for all nonattainment pollutants and their precursors. In fact, permitted emissions above offset thresholds equivalent to the District's thresholds of significance for criteria pollutants are mitigated to below the thresholds, and the District's attainment plans show that this level of emissions increase will not interfere with attainment or maintenance of ambient air quality standards.
>
> The District's attainment plans demonstrate that project-specific net emissions increase below NSR offset requirements will not prevent the District from achieving attainment. Consequently, emission impacts from sources permitted consistent with NSR requirements are not individually significant and are not cumulatively significant. (SJVAPCD 2015, Section 8.8.4.)

As stated above, to evaluate whether the activities that would be authorized under the project would result in a cumulatively considerable net increase of any criteria pollutant for which the district is nonattainment, pollutant emissions will be evaluated against the SJVAPCD Criteria Pollutant thresholds listed in Table 4.3-8. For this analysis, if these thresholds are exceeded then the project would be considered to have significant impacts.

Source data and emissions associated with the project were determined based on the Air Quality Impact Analysis (Appendix B-1). The analysis is supplemented with information from Section 4.3, *Air Quality* of the Oil and Gas EIR. Air quality impacts associated with the project are separated by construction and operational emissions. The emissions tables presented are derived from the data provided in Appendix B-1 of this EIR.

Table 4.3-8: San Joaquin Valley Air Pollution Control District Criteria Pollutant Emissions Significance Thresholds (tons per year)

Pollutant/ Precursor	Construction Emissions	Operational Emissions	
		Permitted Sources and Activities	Non-Permitted Sources and Activities
ROG	10	10	10
NO_X	10	10	10
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15
CO	100	100	100
SO_X	27	27	27

Source: SJVAPCD 2015, Section 8.3.
Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
ROG = reactive organic gases
SO_XS = sulfur oxides

The air analysis uses a baseline level equivalent to the 2022 Annual Emissions Inventory for current operations of on-site emissions sources. Emissions reported in 2022 are less than the permitted allowable emissions. Although existing oil and gas activities have the potential to increase these emissions over time, the projected emissions for the years from 2015 to 2035 are shown in the Oil and Gas EIR Table 4.3-31. The beginning of construction is 2026, and the 2025 emissions from the Oil and Gas EIR Table 4.3-31 are summarized in Table 4.3-9.

Table 4.3-9: 2025 Estimated Incremental Emissions from Kern County Oil and Gas Non-Permitted Equipment and Activities per New Well in Tons per Year

Year	New Authorized Wells	NO_X	ROG	CO	SO_2	PM_{10}	$PM_{2.5}$
2025	3,647	4,936	2,668	8,456	12	631	201

Source: Kern SREIR
Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
ROG = reactive organic gases
SO_2 = sulfur dioxide

All wells for the project, including the abandonment of over 200 oil and gas wells are included in this total as they are in project area for the Oil and Gas SREIR. In the County permitting years from 2016 to 2022, no more than 1,891 oil and gas conformity review permits and no more than 2,395 total permits (including conformity reviews, reworks and minor activity reviews) were issued in a

single year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division (CalGEM) permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the County permits) since 2019. This analysis is, therefore, a very conservative impact review projected emissions.

Construction Emissions

To estimate emissions associated with construction activities associated with the proposed project, each activity was estimated separately for:

- Capture facilities
- Pipeline construction
- Well pad construction
- Well drilling construction

The data sources and assumptions used to estimate construction emissions are detailed in Appendix B-1.

The analysis of emissions generated in the construction of new facilities takes into account baseline and future activities. On-road and off-road emission factors associated with construction were estimated using two models: EMFAC2011 for on-road emission factors and OFFROAD2011 for off-road emission factors. Total emissions were calculated using the CalEEMod model.

Total emissions generated during the construction of the project and the SJVAPCD construction emissions thresholds are summarized in Table 4.3-10. This table includes emissions resulting from the construction of capture facilities, pipelines, well pads, and wells. The emission estimates include exhaust from anticipated construction equipment as well as emissions from haul truck, vendor, and commuter trips.

Table 4.3-10: Annual Construction Emissions (Tons/Year)

	Pollutant (tons/year)					
Emissions Source	**ROG**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Facilities Construction Year 1	0.61	3.99	5.14	0.01	0.79	0.32
Pipelines Construction	0.74	6.07	7.06	0.01	0.42	0.3
Year 1 Construction Total	**1.35**	**10.06**	**12.2**	**0.02**	**1.21**	**0.62**
Facilities Construction Year 2	0.57	3.65	4.97	0.01	0.77	0.3
Well Pads Construction	0.05	0.39	0.47	0	0.07	0.03
Wells Construction	0.08	2.72	2.28	0.01	0.21	0.12

Table 4.3-10: Annual Construction Emissions (Tons/Year)

Emissions Source	Pollutant (tons/year)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Year 2 Construction Total	**0.7**	**6.76**	**7.72**	**0.02**	**1.05**	**0.45**
SJVAPCD Construction Emissions Threshold	10	10	100	27	15	15

Source: Trinity 2023
Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
ROG = reactive organic gases
SO_2 = sulfur dioxide

Total project emissions resulting from the construction of new facilities on an annual basis would exceed the SJVAPCD Criteria Pollutant Emissions Significance Thresholds for NO_X during Year 1 of construction.

Operational Emissions

Operational emissions sources include emissions from facilities that are stationary sources, emissions from permit-exempt sources, such as small pumps and emissions from mobile sources, such as vehicles. The analysis that follows is consistent with the recommendations of the SJVAPCD's March 2015 Guidance for Assessing and Mitigating Air Quality Impacts that operational criteria pollutant emissions associated with permitted sources and activities be evaluated separately from non-permitted sources and activities (SJVAPCD 2015, Section 8.3.3).

Permitted Stationary Equipment

Activities that would be authorized under the project would not include any permitted stationary source of air pollutant emissions. Because the project would not include permitted stationary equipment, there would be no increase in these emissions.

Permit Exempt Equipment

The CCS capture facility will be located at the existing stationary source CGP-1 Facility and would capture CO_2 from natural gas streams which provides fuel for the 550 Mw Elk Hills Power Plant. The project is not requesting any increase to any existing permitted stationary sources. In addition to the existing permitted sources, two new amine units and associated compression and pumping facilities (collectively "capture facilities") will be installed (one in each phase) at the project site. These capture facilities will have criteria emissions from fugitive component leaks and have been calculated according to the California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities, as described in the Air Quality Impact Analysis (Appendix B-1). The emissions from the capture facilities are summarized in Table 4.3-11.

Table 4.3-11: Capture Facilities: Stationary Source Permit Exempt Equipment Emissions

Emissions Source	Pollutant (tons/year)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Phase 1 Amine Unit	0.53	0.00	0.00	0.00	0.00	0.00
Phase 2 Amine Unit	0.53	0.00	0.00	0.00	0.00	0.00

Source: Trinity 2023
Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
ROG = reactive organic gases
SO_2 = sulfur dioxide

The emissions from the capture facilities would not exceed the SJVAPCD thresholds for any pollutants. Therefore, permit exempt equipment emissions would have a less than significant impact.

Fugitive Dust

Operation of the project site at full buildout is not expected to present a substantial source of fugitive dust (PM_{10}) emissions. The main source of PM_{10} emissions would be from vehicular traffic associated with the project site.

PM10, on its own as well as in combination with other pollutants, creates a health hazard. The SJVAPCD's Regulation VIII establishes required controls to reduce and minimizing fugitive dust emissions. The following SJVAPCD Rules and Regulations apply to the proposed project (and all projects):

- Rule 4102 - Nuisance
- Regulation VIII – Fugitive PM_{10} Prohibitions
- Rule 8011 - General Requirements
- Rule 8021 - Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities
- Rule 8041 - Carryout and Trackout
- Rule 8051 - Open Areas

The project would comply with applicable SJVAPCD Rules and Regulations, the local zoning codes, and additional emissions reduction measures recommended under MM 4.3-2.

Mobile Sources

Mobile emissions sources include on-road sources of emission, such as gasoline-fueled light-duty autos and heavy-duty diesel trucks; off-road sources, such as trucks and tractors, and portable equipment, such as accumulators, generators, and pumps.

Project-related transportation activities from employees would generate mobile source ROG, NOx, SO_X, CO, PM_{10}, and $PM_{2.5}$ exhaust emissions. Exhaust emissions would vary substantially from day to day but would average out over the course of an operational year. The Traffic Study (Appendix I-1) analyzed the potential for operational vehicular traffic from the operations and maintenance of the CCS facilities. The traffic study estimated the project would require 10 additional workers at the project site each day. EMFAC2021 v1.0.2 was used to estimate mobile source emissions from 20 trips per day with a trip length of 40 miles. The emissions are shown in Table 4.3-12.

Table 4.3-12: Mobile Emissions

Emissions Source	Pollutant (tons/year)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Mobile Emissions	0.002	0.012	0.222	0.001	0.005	0.002

Source: Trinity 2023
Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
ROG = reactive organic gases
SO_2 = sulfur dioxide

The total annual emissions of all criteria pollutants from mobile sources associated with the project do not require air permits and, therefore, would not be offset.

Total Well Emissions

Table 4-3-13 list the project's wells, well depths and associated total emissions (NO_X, ROG, and PM_{10}), as detailed in the Air Quality Impact Analysis.

Table 4.3-13: Total Emissions on a Per Well Basis

Well Name	Description	Depth (ft)	Emissions (Tons)
26R Reservoir			
363C-27R	Injector	6290	4.55
353XC-35R (new)	Injector	6390	4.55
373-35R (new)	Injector	7010	5.36
345C-35R (new)	Injector	5690	3.98
341-27R	Plume monitoring	6981	4.55

Table 4.3-13: Total Emissions on a Per Well Basis

Well Name	Description	Depth (ft)	Emissions (Tons)
328-25R	Plume monitoring	5268	3.98
376-36R	Plume monitoring	5832	3.98
355X-26R	Above-zone monitoring	4063	2.35
USDW Monitoring (new)	USDW monitoring	400	1.28
A1/A2 Reservoir			
355-7R	Injector	8387	6.17
357-7R	Injector	8420	6.17
353A-7R	Plume monitoring	8773	6.17
335X-7R	Plume monitoring	8737	6.17
327-7R-RD1	Above-zone monitoring	3782	2.03
345-7R	A3+ Monitoring	8904	6.17
388X-7R	A3+ Monitoring	8800	6.17
342-17R	A3+ Monitoring	8844	6.17
USDW Monitoring (new)	USDW monitoring	740	1.28
		Total	**81.08**

Source: Trinity 2023
Key:
ft = feet
USDW = underground source of drinking water

Total Project Emissions

Total project emissions were calculated using a conservative emissions scenario assuming all construction and operational activities could occur simultaneously. As summarized in Table 4.3-14, NO_X emissions would exceed the threshold; therefore, total operational emissions would result in a potentially significant impact. The construction of the wells shown on Table 4.3-14 includes all criteria pollutants from the drilling and construction of the wells which are primarily generating PM_{10} and $PM_{2.5}$. The total of all project emissions from all sources of construction and operation is 123.22 tons.

Table 4.3-14: Project Total Emissions

Emissions Source	Pollutant (tons/year)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Fugitive Dust	-	-	-	-	-	-
Mobile Emissions	0.002	0.012	0.222	0.001	0.005	0.002
Phase 1 Amine Unit	0.53	0.00	0.00	0.00	0.00	0.00
Phase 2 Amine Unit	0.53	0.00	0.00	0.00	0.00	0.00

Table 4.3-14: Project Total Emissions

Emissions Source	Pollutant (tons/year)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Total Operational Emissions	0.532	0.012	0.222	0.001	0.005	0.002
Year 1 Construction Total	1.35	10.06	12.2	0.02	1.21	0.62
Year 1 – Well Drilling activities	Inclusive [(a)]	Inclusive	Inclusive	Inclusive	19.94	14.64
Year 2 Construction	0.7	6.76	7.72	0.02	1.05	0.45
Year 2 – Well Drilling activities	Inclusive	Inclusive	Inclusive	Inclusive	25.31	21.19
Total						
Total Project Emissions	2.58	16.83	20.14	0.04	47.52	36.90
SJVAPCD Operational Emissions Threshold	10	10	100	27	15	15
Is Threshold Exceeded?	No	**Yes**	No	No	**Yes**	**Yes**

Note:
[(a)] The well drilling emissions shown in the PM_{10} and $PM_{2.5}$ column are inclusive of all activities and criteria pollutant amounts generated by drilling and constructing the well including equipment, employee trips and factor for cumulative impacts of all active oil wells.
Source: Trinity 2023
Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
ROG = reactive organic gases
SJVAPCD = San Joaquin Valley Air Pollution Control district
SO_2 = sulfur dioxide

Because the project's total emissions would exceed the SJVAPCD thresholds for PM_{10} and $PM_{2.5}$, for which the project region is nonattainment under an applicable federal or state ambient air quality standard, this impact is considered significant before mitigation. Based on the nonattainment status of the air basin, regional health risks associated with air quality impacts and the requirement under CEQA that all reasonable and feasible mitigation be required, MM 4.3-9 requires the execution of a Developer Mitigation Agreement (DMA) with the SJVAPC District for mitigation of criteria pollutants.

The implementation of a DMA (MM 4.3-5) to reduce criteria pollutants of NO_X, ROGs, and PM net incremental emissions generated by a project has been incorporated into development projects in the county since 2008.

This is the same instrument and pathway the air district calls a VERA. Once applied as mitigation they are not a "voluntary" agreement with the SJVAPCD but is mandated by enforceable mitigation measures and is, therefore, called a DMA. The emission reductions required by a DMA are normally implemented within the SJVAB in quantities sufficient to fully mitigate the project's air quality impacts such that development of the project could be considered to result in no net increase in the designated criteria pollutant emissions over the criteria pollutant emissions that would otherwise exist without the development of the project, all to be verified by the SJVAPCD. The mandated emission reductions will be achieved by a menu of options that range from paying a calculated mitigation fee for use in doing emission reduction projects through a grant-type program to applicants in a pre-determined area. The executed DMA will require the payment of a calculated mitigation fee per ton to the SJVAPCD. The agreement also includes an additional administrative fee of 4 percent collected for the SJVAPCD. Expenditure of the mitigation funds is then done for certified air quality reduction projects through the SJVAPCD. Final determination of air quality reductions achieved shall be under the determination of the SJVAPCD. Projects that may be eligible for funding include but are not limited to the current amount per ton for 2024 established by the District for an ISR is $13,153 per ton plus the 4 percent administration fee. The current estimate for the mitigation fee amount is $1,625,973.86 plus the 4 percent administrative fee. Although normally the funding is used anywhere in the eight-county air basin for air emission reduction grants, SB 905 legislation for CCS projects has established a more specific area for mitigation.

Under the legislative requirements of Section 39741.1 of the California Health and Safety Code all funding shall be used in disadvantaged communities near the CCS project. MM 4.3-9 therefore details that unincorporated communities and incorporated cities within a 20-mile radius, measured from the corners of the CCS Surface Land Area are eligible for the use of the funding for qualified projects and shall be known as "Eligible CCS Air Funding Communities.". No funding can be used outside those areas. Examples of feasible air emission reduction activities that may be funded by the DMA grants include, but are not limited to, the following:

- Replacing or retrofitting diesel-powered stationary equipment such as motors on generators, pumps and wells with electric or other lower-emission engines that are not subject to Title V reductions
- Replacing or retrofitting diesel-powered school, transit, municipal and other community mobile sources such as buses, car fleets, and maintenance equipment, with electric or other lower-emission engines
- Reducing emissions from public infrastructure sources such as water and wastewater treatment and conveyance facilities and reducing water-related emissions through water conservation and reclamation
- Funding lower-emission equipment and processes for local businesses, schools, non-profit and religious institutions, hospitals, city and county facilities, including electric vehicle charging facilities and electric vehicle transportation options for the selected communities

To support the implementation of the grant funding additional funding of $ 140,000 a year will be provided to the Kern County Planning and Natural Resources Department for a dedicated staff

resource to assist communities and cities is designing and applying for the grants in the Eligible CCS Air Funding Communities. This annual funding shall continue until all the mitigation funding is expended.

As implemented, the DMA results in greater reductions than would otherwise occur under the District's ISR, since the ISR does not require ROG reductions and the ISR only requires a percentage of reductions rather than full reductions of NO_X and PM resulting from project construction and operations. When adopting the ISR and the subsequent VERA/DMC programs, the District acknowledges that as ROG is a precursor to ozone, the reductions are not required in the VERA/DMA. Instead, the reductions are achieved by increasing the NO_X and PM tonnage for project levels; see SJVAPCD (2005); this and other key SJVAPCD documents are included as Appendix B-3. As the actual amount of ROG reductions achieved from NO_X and PM_{10} reductions is not absolutely certain, project emissions are still considered significant and unavoidable; however, all feasible and reasonable mitigation has been required to reduce criteria pollutants as close to "no net increase" as scientifically possible. This approach has been found legally sufficient by court rulings in the following cases: *California Building Industry Assn. v. San Joaquin Valley APCD*, Fresno County Case No. 06 CECG 02100 DS13; *National Association of Home Builders v. San Joaquin Valley Unified Air Pollution Control District*, Federal District Court, Eastern District of California, Case No. 1:07-CV-00820-LJO-DLB; and *Center for Biological Diversity et al. v. Kern County*, Fifth Appellate District, Case No. F061908.

Mitigation Measures

MM 4.3-5 Prior to issuance of any grading or construction permits the Owner/Operator shall enter into an Developer Mitigation Agreement (DMA) with the San Joaquin Valley Air Pollution Control District. The DMA is to mitigation criteria emissions of the CCS project implementation, not required to be offset under a District rule as described in MM 4.3-1, and for Project vehicle and other mobile source emissions. The Owner/operator shall pay fees to fully offset Project emissions of NOx (oxides of nitrogen), ROG (reactive organic gases), PM10 (particulate matter of 10 microns or less in diameter), and PM2.5 (particulate matter of 2.5 microns or less in diameter) (including as applicable mitigating for reactive organic gases by additive reductions of particulate matter of 10 microns or less in diameter) (collectively, "designated criteria emissions") to avoid any net increase in these pollutants. The air quality mitigation fee shall further be paid prior to the approval of any construction or grading approval and shall be used to reduce designated criteria emissions to fully offset Project emissions that are not otherwise required to be fully offset by District permit rules and regulations.

a. Examples of feasible air emission reduction activities that may be funded by air quality fees paid by Owner/operator or proposed and implemented by the Owner/operator under the emission reduction agreement include, but are not limited to, the following:

    1. Replacing or retrofitting diesel-powered stationary equipment such as motors on generators, pumps and wells with electric or

other lower-emission engines that are not subject to Title V reductions.

2. Replacing or retrofitting diesel-powered school, transit, municipal and other community mobile sources such as buses, car fleets, and maintenance equipment, with electric or other lower-emission engines.

3. Reducing emissions from public infrastructure sources such as water and wastewater treatment and conveyance facilities and reducing water-related emissions through water conservation and reclamation.

4. Funding lower-emission equipment and processes for local businesses, schools, non-profit and religious institutions, hospitals, city and county facilities, including EV Charging facilities and electric vehicle transportation options for the selected communities.

b. Under the legislative requirements of Section 39741.1 of the California Health and Safety Code all funding shall be used in disadvantaged communities near the CCS project. Unincorporated communities and incorporated cities within a 20 mile radius, measured from the corners of the CCS Surface Land Area are eligible for the use of the funding for qualified projects and shall be known as "Eligible CCS Air Funding Communities." No funding shall be used outside those areas.

c. The owner/ operator shall provide an annual payment of $ 140,000 to the Kern County Planning and Natural Resources Department for the creation of a county managed community liaison position to provide technical support to the Eligible CCS Air Funding Communities and coordination with the San Joaquin Valley Air Pollution Control District to expedite use of the funding for air mitigation projects. The first payment shall be made 30 days after approval of the Developer Mitigation Agreement by the SJVAPCD. Annual payments shall be made by January 31 in the following years until final closure of the CO2 injection activities.

d. The Agreement shall be reviewed by the California Air Resources Board for compliance with requirements of Section 39741.1 of the California Health and Safety Code before execution and adoption.

Level of Significance After Mitigation

Impacts would be significant and unavoidable**.**

Impact 4.3-3: Expose Sensitive Receptors to Substantial Pollutant Concentrations

Toxic Air Contaminants

The primary TAC of concern for this project would be DPM emitted within the project site from the construction of the proposed project. The proposed project would result in new emissions of HAPs of DPM from construction equipment exhaust and operational fugitive VOC emissions from the new amine units and would be located near existing residents and workers; therefore, an assessment of the potential risk to the population attributable to emissions of hazardous air pollutants from the proposed project is required.

An HRA was completed for the project as part of the Air Quality Impact Assessment using the HARP2 software distributed by the California Air Resources Board. The HRA evaluated the potential cancer risk and acute and chronic non-cancer risk from toxic emissions associated with construction and operation of the project. For construction health impacts, diesel combustion emissions from diesel on-site construction equipment, haul trucks, and vendor trips were modeled as an area source for on-site construction activity on the property. DPM was calculated using CalEEMod for on-site construction equipment. For operational health impacts, Fugitive leaks were modeled as volume sources.

Total cancer risk was predicted for 177 discrete off-site receptors. A hazard index was computed for chronic non-cancer health effects for each applicable endpoint and each receptor. A hazard index for acute non-cancer health effects was computed for each applicable endpoint and each receptor. SJVAPCD has set the level of significance for carcinogenic risk at twenty in one million (20×10^6), which is understood as the possibility of causing twenty additional cancer cases in a population of one million people. The level of significance for chronic and acute non-cancer risk is a hazard index of 1.0. All receptors were modeled as residential receptors with a 70-year exposure. This is conservative since all on-site receptors and business receptors would be exposed less than 70 years.

The carcinogenic risk and the health hazard index for chronic non-cancer risk at the points of maximum impact do not exceed the significance levels of twenty in one million (20 x 10-6, 2.0E-05) and 1.0, respectively for the proposed project. The maximum impact values are summarized in Table 4.3-15. Additional methodology details and electronic modeling files are provided in Appendix B-1.

Table 4.3-15: Potential Maximum Health Risk Summary

	Value	SJVAPCD Significance Threshold	Is Threshold Exceeded?
Excess Cancer Risk	2.62E-07	2.00E-05	No
Chronic Hazard Index	1.74E-04	1.0	No
Acute Hazard Index	6.46E-04	1.0	No

Source: Trinity 2023
Key:
SJVAPCD = San Joaquin Valley Air Pollution Control District

The HRA demonstrates that Cancer, Chronic, and Acute risk impacts related to project construction would not exceed established thresholds at nearby sensitive receptors. Additionally, non-carcinogenic and acute hazards at nearby sensitive receptors are calculated to be within acceptable limits for the project. As such, the health risk impact attributed to the construction and operation would not exceed risk thresholds, and impacts would be less than significant.

Carbon Dioxide

The project includes approximately 11 miles of CO_2 facility pipelines and injection lines. The injection pipeline and the facility pipelines would be newly designed and constructed underground to facilitate the transport of the CO_2 gas to the injection wells. When CO_2 in a super-critical phase (which is common for CO_2 pipelines) if released into open air, it naturally vaporizes into a heavier than air gas and dissipates. CO_2 vapor is 1.53 times heavier than air, and displaces oxygen, so it can act as an asphyxiant to humans and animals. The National Institute for Occupational Safety and Health has established that concentrations of 40,000 ppm are immediately dangerous to life and health. The Occupational Safety and Health Administration has established 5,000 ppm as a permissible exposure limit, which is an 8-hour time-weighted average (Mathews 2022) (Appendix B-2).

If CO_2 were to escape into the atmosphere via either well failure or pipeline rupture, the project could result in health impacts to humans and wildlife. Risk of pipeline rupture is discussed in Section 4.7, *Geology and Soils* and Section 4.9, *Hazards and Hazardous Materials*. With implementation of MM 4.3-5, MM 4.3-7, MM 4.3-8, MM 4.7-1, MM 4.9-9, and MM 4.9-10 potential impacts associated with pipelines rupture and/or well failure would be reduced; but would remain significant and unavoidable.

Valley Fever

The *Coccidioides immitis* fungus spores in soil, which are responsible for transmitting the Valley Fever, can disperse in the air when the soil is disturbed during construction activities, and then can be inhaled into the lungs. On-site construction workers potentially could be exposed to Valley Fever from fugitive dust generated during construction of the proposed project, notably during excavation, grading, and other earthmoving activities. While there are no specific thresholds for the evaluation of potential Coccidioides immitis (Valley Fever) exposure, the potential for workers or area residents contracting Valley Fever as a result of the project is evaluated based on the anticipated earthmoving activities, and considers applicant-proposed measures and compliance with Rule 8021, Section 6.3, which requires development and implementation of a dust control plan to help control the release of the Coccidioides immitis fungus during construction activities. Construction activities within the project area are subject to SJVAPCD Regulation VIII (Fugitive PM_{10} Prohibition). Regulation VIII is intended to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce, or mitigate anthropogenic fugitive dust emissions. MM 4.3-6 would be implemented to further reduce impacts associated within Valley Fever and pandemics. By reducing fugitive dust emissions, Regulation VIII reduces potential exposure to Valley Fever. Since current long-term residents typically already have been exposed to and have developed immunity to Valley Fever, construction activities are not expected to add significantly to exposure of off-site residents to the fungus.

Mitigation Measures

The project shall be required to implement MM 4.7-1, MM 4.9-9 and MM 4.9-10 relative to risks of exposure to CO_2 from pipeline rupture. Furthermore, the project would be required to comply with the following mitigation measure for sensitive receptors.

MM 4.3-6 No Class VI or Class II injection well for use in this CCS project shall be located within 4000 feet of any sensitive receptor.

MM 4.3-7 The following measures shall be implemented to address Valley Fever and pandemics:

A. Project shall include in the Worker Environmental Awareness Program information on how to recognize the symptoms of Valley Fever and to promptly report suspected symptoms of work-related Valley Fever to a supervisor. A Valley Fever informational handout shall be provided to all on-site construction personnel. The handout shall, at a minimum, provide information regarding the symptoms, health effects, preventative measures, and treatment. Additional information and handouts can be obtained by contacting the Kern County Public Health Services Department. On-site personnel shall be trained on the proper use of personal protective equipment, including respiratory equipment. National Institute for Occupational Safety and Health (NIOSH)-approved respirators shall be provided to on-site personal, upon request as part of the Worker Environmental Awareness Training Program.

B. A payment of $3500 shall be made to the Kern County Public Health Services Department for the specific purposes of continued Valley Fever education and outreach.

C. Owner/operators shall implement all orders related to the COVID-19 pandemic or any other pandemic mandated by Kern County Public Health on well sites and related to worker safety.

MM 4.3-8 Prior to issuance of any construction or grading permits, the Owner/operator shall consult with the San Joaquin Valley Air Pollution Control District and develop a draft Air Monitoring program for fence line monitoring of all air constituents generated by the CCS project including but not limited to: criteria pollutants, CO_2, and H_2S. The plan shall be reviewed and approved by both the San Joaquin Valley Air District and the California Air Resources Board, with a draft copy to the EPA UIC Program and Kern County Planning and Natural Resources and implemented before any construction on the CCS facilities can occur. The final approved plan shall be provided to the EPA UIC Program and Kern County Planning and Natural Resources.

MM 4.3-9 Prior to issuance of any grading or construction permits, the Owner/Operator shall comply with all requirements of the State of California requirements under Section 39741.1 of the California Health and Safety Code. Mitigation Measures that are more restrictive than the final adopted State Framework shall be implemented and

cannot be waived by the State Carbon Framework determinations and must be implemented.

Level of Significance After Mitigation

Impacts would be significant and unavoidable.

Impact 4.3-4: Result in Other Emissions Such as Those Leading to Odors Adversely Affecting a Substantial Number of People

The SJVAPCD's GAMAQI states "An analysis of potential odor impacts should be conducted for both of the following two situations:

1. Generators – projects that would potentially generate odorous emissions proposed to locate near existing sensitive receptors or other land uses where people may congregate, and
2. Receivers – residential or other sensitive receptor projects or other projects built for the intent of attracting people locating near existing odor sources."

The GAMAQI also states that the District has identified some common types of facilities that have been known to produce odors in the SJVAB. Land uses typically producing objectionable odors include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The District has also identified a reasonable distance from the source within which, the degree of odors could possibly be significant.

The proposed project does not include any uses that would be associated with objectionable odors. Odors would come predominantly from construction equipment, which would cease immediately after construction is complete. Furthermore, the project would be required to comply with CCR, Title 13, Sections 2449(d)(3) and 2485, which minimizes the idling time of construction equipment either by shutting it off when not in use or by reducing the time of idling to no more than five minutes. This would further reduce the detectable odors from heavy-duty equipment exhaust. Construction- related odors would be short-term and cease upon project completion. The closest sensitive receptor to the project site is McKittrick Elementary School, which is located 4.6 miles southwest of the facility pipeline, and the nearest residence is approximately 4.5 miles southeast of the injection line and facility pipeline. Therefore, short-term fueling odors during construction would not impact a substantial number of people. As such, the proposed project is not expected to result in adverse emissions affecting a substantial number of people.

Because there are no receptors located within a 1-mile radius of the project, the project would not be a source of objectionable odors.

Based on the provisions of the SJVAPCD's GAMAQI, the proposed project would not exceed any screening trigger levels to be considered a source of objectionable odors or odorous compounds (SJVAPCD 2015). Furthermore, there does not appear to be any significant source of objectionable odors in close proximity that may adversely impact the project site when it is in operation. Additionally, the project emissions estimates indicate that it would not be expected to adversely

impact surrounding receptors. As such, the proposed project would not be a source of any odorous compounds. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

4.3.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance. *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018, an SREIR certified on March 8, 2021, and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year countywide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic wells, observation wells, steam flood injectors, air injection, and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 of other wells (cyclic wells, SB 4 activities, plugged and abandoned) per year (pages 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. CalGEM permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The regional plans and projections evaluated in this cumulative analysis are described in Section 3.9, *Cumulative Projects*, of this EIR. Implementation of these plans and any projects associated with these plans would be required to comply with the goals, policies, and implementation measures of applicable federal and local laws and land use standards imposed by the respective jurisdictions within with each related project is located. All projects noted as being located in unincorporated Kern County will require analysis under CEQA and appropriate air mitigation. Projects in other jurisdictions will be subject to the lead agency determination of the appropriate pathway and CEQA analysis.

Impact 4.3-5: Result in Other Cumulatively Considerable Air Quality Impacts

As discussed above in Impact 4.3-2, by its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development. Future attainment of State and Federal ambient air quality standards is a function of successful implementation of the District's attainment plans. Consequently, the District's application of thresholds of significance for criteria pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality. and the potential for the project's emissions to cause a cumulatively considerable net increase of criteria pollutants for which the SJVAPCD is nonattainment is discussed in Impact 4.3-2. However, the Kern County Air Quality Assessment Guidelines further require the cumulative air quality impact assessment to include consideration of the following issues:

- Consistency with Existing Air Quality Plans. Discuss the project in relation to Kern COG conformity and traffic analysis zones. Quantify emissions from similar projects and evaluate consistency with the applicable attainment plan.
- Localized Impacts. Assess the cumulative emissions impact associated with the proposed project, in conjunction with approved and proposed projects located within a 1- and 6-mile radius of the proposed project.
- Air Basin Emissions Analysis. Compare emissions from the proposed project to emissions within the SJVAB and the Kern County portion of the SJVAB.

Consistency with Existing Air Quality Plans

The project's consistency with the existing air quality plan is discussed under Impact 4.3-1 and it was determined the project could potentially conflict with or obstruct implementation of the applicable air quality plan or potentially be inconsistent with the General Plan measures and, therefore, could be significant.

Localized Impacts

Efforts to reduce emissions in the Kern region that have been conducted since the early 1990s at the national, state, regional, and local entities since the early 1990s are presented in Table 4.3-16. The agencies involved are the EPA, U.S. Department of Energy, Federal Highway Administration, Federal Transit Administration, CARB, California Department of Transportation, California

Energy Commission, SJVAPCD, Eastern Kern APCD, and Kern COG and its local member agencies.

Table 4.3-16: Programs Designed to Reduce Air Pollutant Emissions

Level	Program
National	Corporate Average Fuel Economy Standards Fuel Pricing Locomotive Idling Reduction Locomotive Replacement or Repowering Transportation Construction Equipment Reductions
State	AB 118 – Air Quality Improvement Program AB 2766 – Motor Vehicle Fee Program CalStart Cap-and-Trade Program Clean Diesel Clean Vehicle Rebate Project High-Occupancy Vehicle Facilities Incident management/Kern 511 Traveler Information Inspection & Maintenance Programs Moyer Program Park-and-Ride Facilities Shifting/Separation Freight Movements Signal Synchronization and Roadway Intersection Improvements
Regional	CalVans Vanpool Program Commute Kern TDM Programs/Incentives Diesel Engine Retrofits Incentive Program Drive Clean Rebate Program IdleAIR Idling Reduction Facilities Project Clean Air (PCA) REMOVE II Programs Retirement/Replacement of Heavy-Duty Trucks Incentives Program Rule 8061 (SJVAPCD) Unpaved Road Dust Mitigation Rule 9310 (SJVAPCD) School Bus Fleets: Retirement/Replacement of Buses Rule 9410 (SJVAPCD) Employer-Based Trips Reduction (eTRIP) Rule 9510 (SJVAPCD) Indirect Source Review: Infill Incentive Zone Transportation Impact Fee Land Use Strategies. Valley Clean Air Now (CAN)
Local	Bicycle/Pedestrian Projects and Programs GET Online Trip Planner Transit Marketing, Information, and Amenities New/Expanded/Increased Transit Services Road Paving & Street Sweeping

Key:
SJVAPCD = San Joaquin Valley Air Pollution Control District
TDM = Transportation Demand Management

As explained in Impact 4.3-2 above, the construction activities associated with the project would result in a net increase of NO_X in excess of the recommended criteria pollutant significance threshold adopted by the SJVAPCD Board.

Emissions associated with the implementation of the project would not be counterbalanced by the above efforts to reduce emissions undertaken at the State and local levels, as well as the air quality improvement goals stated in the 2022 RTP. Therefore, the contribution of project-related impacts on air quality would be potentially significant.

Air Basin Emissions Analysis

To evaluate the contribution of the project's total emissions relative to the cumulative air quality conditions in Kern County and the SJVAB, the project's specific emissions are compared to the 2020 emissions inventory and the 2025 projected emissions of Kern County and the. Table 4.3-17 provides the emissions comparison of the project with Kern County and SJVAB in 2020, and Table 4.3-18 provides the emissions comparison of the project with Kern County and SJVAB in 2025.

As shown in Table 4.3-17 and Table 4.3-18, the project would contribute up to 0.11 percent of these pollutants in the county in 2020, and the project would contribute up to 0.16 percent of these pollutants in the county in 2025. It is speculative to determine how exceeding the regional thresholds would affect the number of days the region is in nonattainment since mass emissions are not correlated with concentrations of emissions or how many additional individuals in the air basin would be affected by the health impacts mentioned. The SJVAPCD is the primary agency responsible for ensuring the health and welfare of sensitive individuals to elevated concentrations of air quality in the San Joaquin Valley Air Basin at the present time and it has not provided methodology to assess the specific correlation between mass emission generated and the effect on public health and welfare. Therefore, cumulative impacts for criteria pollutants are considered significant and unavoidable.

Mitigation Measures

Implement MM 4.3-1 through MM 4.3-9, as described above.

Level of Significance After Mitigation

Impacts would be significant and unavoidable.

Feasible and Reasonable Mitigation Analysis

A discussion of suggested mitigation for air impacts that was identified, considered, and rejected is provided in Section 4.3, *Air Quality*, of the Oil and Gas EIR.

Table 4.3-17: Comparative Analysis Based on San Joaquin Valley Air Basin 2020 Inventory

Emissions Source	Emissions (Tons/Year)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Project Emissions						
Year 1 Construction Total	1.35	10.06	12.2	0.02	1.21	0.62
Year 2 Construction Total	0.7	6.76	7.72	0.02	1.05	0.45
Project Operation	0.532	0.012	0.222	0.001	0.005	0.002
Total Project Emissions	2.58	16.83	20.14	0.04	2.27	1.07
Kern County and San Joaquin Valley Air Basin Emissions						
Kern County – 2020	21,535	15,878	27,337	511	13,651	3,723
San Joaquin Valley Air Basin - 2020	108,113	74,205	162,425	2,847	69,652	21,535
Analytical Results						
Proposed Project Percent of Kern County	0.01%	0.11%	0.07%	0.01%	0.02%	0.03%
Proposed Project Percent of SJVAB	<0.01%	0.02%	0.01%	<0.01%	<0.01%	<0.01%

Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
SJVAB San Joaquin Valley Air Basin
SO_2 = sulfur dioxide

Table 4.3-18: Comparative Analysis Based on San Joaquin Valley Air Basin 2025 Projection

Emissions Source	Emissions (Tons/Year)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Project Emissions						
Year 1 Construction Total	1.35	10.06	12.2	0.02	1.21	0.62
Year 2 Construction Total	0.7	6.76	7.72	0.02	1.05	0.45
Project Operation	0.532	0.012	0.222	0.001	0.005	0.002
Total Project Emissions	2.58	16.83	20.14	0.04	2.27	1.07
Kern County and San Joaquin Valley Air Basin Emissions						
Kern County – 2025	21,353	10,804	26,674	475	13,651	3,687
San Joaquin Valley – Air Basin - 2025	107,347	52,451	145,964	2,920	95,922	21,280
Analytical Results						
Proposed Project Percent of Kern County	0.01%	0.16%	0.08%	0.01%	0.02%	0.03%
Proposed Project Percent of San Joaquin Valley Air Basin	<0.01%	0.03%	0.01%	<0.01%	<0.01%	0.01%

Key:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 microns
$PM_{2.5}$ = particulate matter less than 2.5 microns
SO_2 = sulfur dioxide

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Section 4.4

Biological Resources

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Section 4.4
Biological Resources

4.4.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for biological resources. It also describes the impacts on biological resources that would result from implementation of the California Resources Corporation's (project proponent) proposed Carbon TerraVault I (Kern County) Project (project). The project site is a specific set of parcels within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself (see Chapter 3, *Project Description*). Elk Hills is located approximately 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

The information and analysis that is presented in this section has been derived from published literature, federal and state databases, a Biological Analysis Report (BAR) conducted by Quad Knopf, Inc. in March 2023 (Appendix C-1). The purpose of the BAR was to evaluate the potential for sensitive biological resources within the project area. The sources of information used in this analysis are listed Chapter 10, *Bibliography*.

4.4.2 Environmental Setting

Regional Setting

Kern County is California's third largest county, encompassing 8,202 square miles at the southern end of the Central Valley. The 9,104-acre project site is predominantly located in the western portion of the county in the San Joaquin Valley, bounded by Kings and Tulare counties to the north, Santa Barbara and San Luis Obispo counties to the west, the Tehachapi Mountains and the Sierra Nevada to east, and the northern boundary of the Los Padres National Forest to the south.

Topography

The project is situated in the eastern section of Kern County near the floor of the San Joaquin Valley. The southern Sierra Nevada foothills are east of the project, and the Temblor Range of the Southern Coast Range lies to the west. The topography of the project area consists of variable terrain from gentle slopes to steep hill slopes. Elevations range from 750 feet above mean sea level (AMSL) to 1,550 feet AMSL.

Climate

The region in which the project is located is characterized by a typical Mediterranean climate of hot summers and mild, wet winters. Average high temperatures range from 57 degrees Fahrenheit (°F) in January to 100°F in July, with daily temperatures exceeding 100°F several days in the

summer. Average low temperatures range from 41°F in December to 67°F in July. Precipitation occurs primarily as rain, most of which falls from December to April, with an average of 5.4 inches of rainfall per year. Precipitation may also occur as a dense fog known as "Tule fog" during the winter months. Rain rarely falls during the summer months.

Vegetation

Vegetation in the Mojave Desert region where the project is located is influenced by arid climatic conditions, topography, desert soils, and past land uses. Vegetation in the region includes a predominance of plant morphological adaptations to extreme aridity (e.g., waxy or resinous leaf cuticles, drought deciduous or succulent plants, woolly leaf pubescence, deep tap root systems) and saline-alkali soils (e.g., salt excretion, active transport systems). Vegetation structure is characterized by short-statured and widely spaced shrubs, and arborescent shrubs resulting from a competition for soil water resources.

Wildlife

Wildlife occurring within the project area is typical of developed oil fields of western Kern County. Bird species included common raven (*Corvus corax*), white-crowned sparrow (*Zonotrichia leucophrys*), and red-tailed hawk (*Buteo jamaicensis*). Reptile species included common side-blotched lizard (*Uta stansburiana*) and coastal whiptail (*Aspidoscelis tigris*). Mammal species included San Joaquin antelope squirrel (*Ammospermophilus nelsoni*), black-tailed jackrabbit (*Lepus californicus*), and coyote (*Canis latrans*). A complete list of wildlife observed is included in the BAR (see Appendix C-1).

Sensitive Natural Communities

Local, State, and federal agencies regulate special status species and other sensitive biological resources and require an assessment of their presence or potential for presence to be on site prior to the approval of proposed development on a property. These species are considered threatened enough to warrant some level of protection. Appendix C-1 discusses sensitive biological resources observed within the project area and evaluates the potential for the project area to support other sensitive biological resources. Assessments for the potential occurrence of special status species are based upon known ranges, species habitat preferences, species occurrence records from the California Natural Diversity Database (CNDDB), California Native Plant Society (CNPS), Information for Planning and Consultation (IPaC), eBird, VertNet, and species occurrence records from other studies in the survey area, and the results of the surveys of the BAR.

Surface Hydrology and Jurisdictional Waters

Elevation ranges throughout the project area. Although no formal wetland delineation was conducted, there are several intermittent channels within the project area (Appendix C-1). These water features appear to be ephemeral drainages that have been impacted by surrounding development. There are also surficial drainages throughout the project area that drain in the direction of the natural topography. Generally, local drainages that exist within the northwestern area of the project typically drain downslope to the north, and drainages within the more southeastern area of the project drain to the north down slopes facing north and south on slopes

facing south toward the Buena Vista Lake area (Appendix G-1). Surface water flow is unlikely to exist within these local drainages unless during heavy precipitation events. As part of the requirements of the Clean Water Act (CWA), beneficial uses for surface and ground waters must be identified in the Central Valley Regional Water Quality Control Board's (RWQCB) Tulare Lake Basin Water Quality Control Plan (Basin Plan). Because the project area contains no surface water bodies, there are no surface water beneficial uses associated with the project area (RWQCB 2018).

Wildlife Movement Corridors

Wildlife movement corridors, also referred to as dispersal corridors or landscape linkages, are generally defined as linear features along which animals can travel from one habitat or resource area to another. Wildlife movement corridors can be large tracts of land that connect regionally important habitats that support wildlife in general, such as stop-over habitat that supports migrating birds or large contiguous natural habitats that support animals with very large home ranges (e.g., coyotes [*Canis latrans*], mule deer [*Odocoileus hemionus californicus*]). They can also be small-scale movement corridors, such as riparian zones, which provide connectivity and cover to support movement at a local scale. The project is situated within two identified connectivity corridors, the Essential Connectivity Area and Core Area (Figure 4.4-1). Specifically, the project falls within the Elk Hills–Carrizo Plain/Temblor Range and Ten Section Oil Field–Elk Hills Essential Connectivity areas.

Local Setting

The project site consists of 9,104 acres, containing up to 20 privately owned parcels, located in the Central Valley portion of the unincorporated area of Kern County, California. The project site is located within the administrative boundaries of Elk Hills and on the west side of Elk Hills Road and the north side of Skyline Road, approximately 26 miles from the city of Bakersfield (with a population of 413,098), approximately 8.5 miles from the city of Taft (with a population of 8,945), and approximately 4 miles from the unincorporated community of Buttonwillow (with a population of 1,443).

The project area is characterized by heavy oil and gas exploration and production including existing well pads, processing facilities, pipeline routes, and access roads. Development in the surrounding area is predominantly oil and gas production, agriculture, and municipalities such as the towns of McKittrick, Tupman, Taft, and Buttonwillow. The project area boundaries encompass a mix of parcels that have been owned and used for oil and gas production or on which leases have been acquired by the project proponent.

Figure 4.4-1: Movement Corridors and Linkages

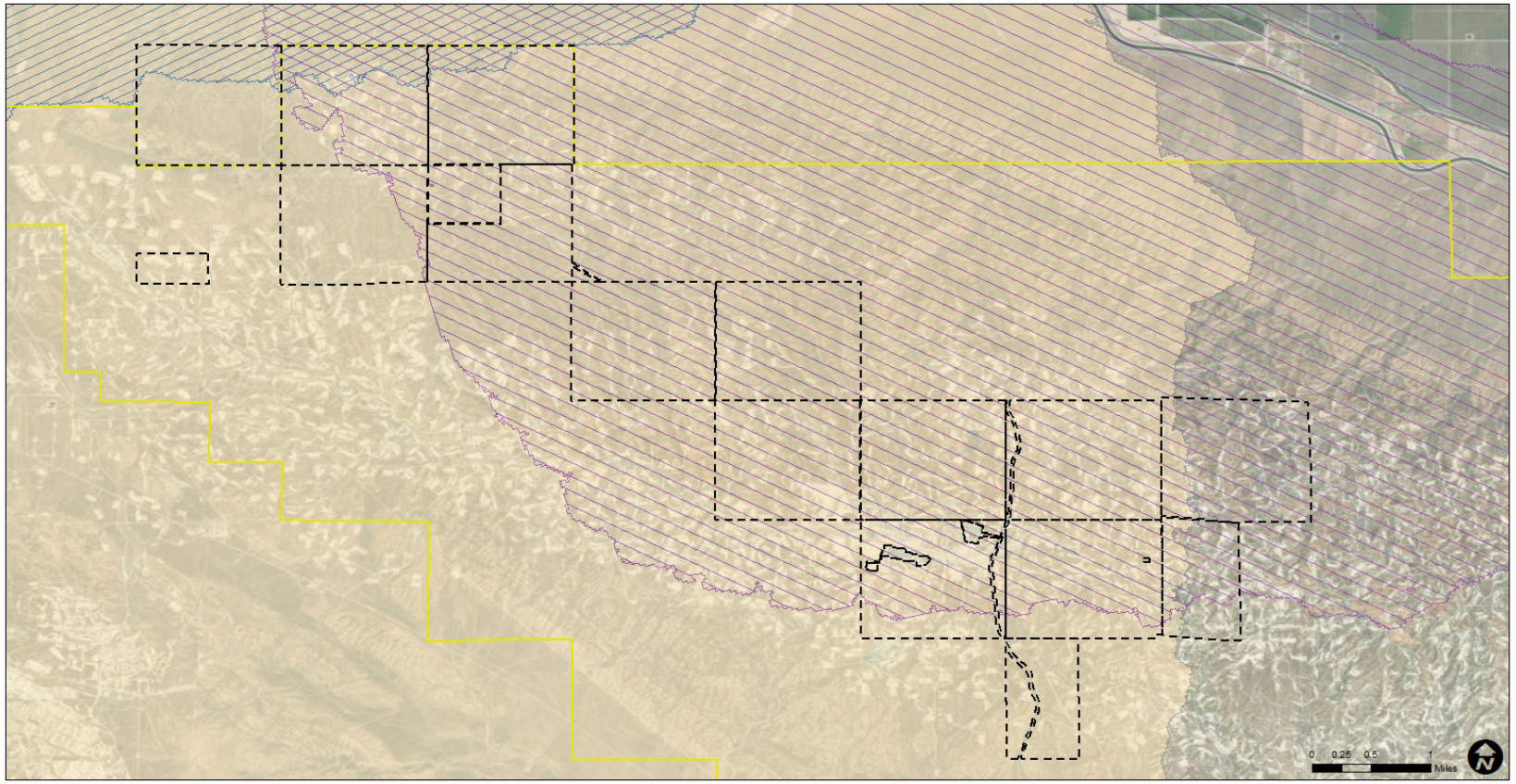

FIGURE 4.4-2: Movement Corridors and Linkages

Draft Environmental Impact Report
Carbon TerraVault I Project

Vegetation

Two habitat types, Valley saltbush scrub and Urban, were present within the project area. The most prevalent habitat type within the project area was Valley saltbush scrub. The BAR identified 23 special status plant species known or with potential to occur in the vicinity of the project. Ten of these species were determined to have potential to occur on the project site because the project supports suitable habitat, is located within the species' known range, and/or the species is documented in or near the project. The BAR further identified three sensitive plant communities that are known to occur or with the potential to occur within the vicinity of the project: Valley saltbush scrub, Great Valley mesquite scrub, and Valley sink scrub. One of these plant communities, Valley saltbush scrub, was observed on site during the reconnaissance surveys.

Soil Types

Five specific soil types occur within the project area: Elkhills sandy loam, Kimberlain sandy loam, and three variations of the Elkhills-Torriorthents stratified, eroded complex (Table 4.4-1).

Table 4.4-1: Soil Types Occurring Within the Project Area

Soil Type
Elkhills sandy loam, 9 to 50 percent slopes, eroded
Elkhills- Torriorthents stratified complex, 9 to 15 percent slopes
Elkhills-Torriorthents stratified, eroded complex, 15 to 50 percent slopes
Kimberlina sandy loam, 5 to 9 percent slopes
Torriorthents stratified, eroded-Elkhills complex, 9 to 50 percent slopes

Source: Quad Knopf, Inc. 2023

Hydrology

The project area is located in the Kern County Subbasin ("Subbasin"), which is bounded by the Kern County Line to the north, the granitic bedrock of the Sierra Nevada foothills to the east, the Tehachapi mountains to the southeast, and by the marine sediments of the San Emigdio Mountains and Coast Ranges to the southwest and west. As further described in Section 4.10, *Hydrology*, the water bearing unit is the Tulare Formation, which contains up to 2,200 feet of interbedded, oxidized to reduced sands, and gypsiferous clays and gravels derived predominantly from Coast Range sources.

Folding and faulting from the deformation of geologic structures has caused unconformities between geologic formations, including a fold belt that extends from Kettleman Hills at the north through Lost Hills to Elk Hills at the southern end. The Elk Hills fold is identified as a restrictive structure that serves as a barrier to groundwater movement because of its angular unconformities and contacts with crystalline and consolidated sedimentary rocks at the Subbasin margins. Water quality is characterized as primarily sodium sulfate to calcium sodium sulfate type.

A query of the National Hydrology Dataset (NHD) and National Wetlands Inventory (NWI) databases indicated several intermittent channels that may intersect the project site. No formal wetland delineations were conducted; however, many of the identified water features appeared to be ephemeral drainages during the site surveys. The project area is located within an "Area of Minimal Flood Hazard" pursuant to the Federal Emergency Management Agency flood zone mapping.

Land Cover Types

Two land cover types, Valley saltbush scrub and Urban, were present within the project area. The most prevalent habitat type within the project area was Valley Saltbush Scrub. The Valley saltbush scrub habitat was comprised of isolated fragments of *Atriplex polycarpa* and *A. spinifera* shrubs, with an understory of forbs and non-native grasses, interspersed with dirt access roads, established pipeline routes, and well pads. The urban habitat is restricted to the southeastern end of the project area and comprises oil and gas facilities and associated paved areas. A complete list of plant species observed during the reconnaissance surveys is included in Appendix C-1.

The BAR identified 23 special status plant species known or with potential to occur in the vicinity of the project. Ten of these species were determined to have potential to occur on the project site because the project supports suitable habitat, is located within the species' known range, and/or the species is documented in or near the project. The BAR further identified three sensitive plant communities that are known to occur or with the potential to occur within the vicinity of the project: Valley saltbush scrub, Great Valley mesquite scrub, and Valley sink scrub. One of these plant communities, Valley saltbush scrub, was observed on site during the reconnaissance surveys.

Valley Saltbush Scrub

This community consists of open, gray or blue-green chenopod scrubs, usually over a low herbaceous annual understory. Areas dominated by *Atriplex polycarpa* or *A. spinifera* may be differentiable from one another. They are typically found on sandy to loamy soils without surface alkalinity, largely on rolling, dissected alluvial fans. They are also found in areas with long, arid summers and short, damp winters, and tule fog is often present during the winters.

Urban

The structure of urban vegetation varies, with five types of vegetative structure defined: tree grove, street strip, shade tree/lawn, lawn, and shrub cover. Tree groves, common in city parks, green belts, and cemeteries, vary in height, tree spacing, crown shape, and understory conditions, depending upon the species planted and the planting design. Shade trees and lawns are typical of residential areas and reminiscent of natural savannas. Species composition in urban habitats varies with planting design and climate. Monoculture is commonly observed in tree groves and street tree strips. A distinguishing feature of the urban wildlife habitat is the mixture of native and exotic species. Both native and exotic species are valuable, with exotic species providing a good source of additional food in the form of fruits and berries. For the purposes of the Urban habitat type for this analysis, Urban is bare ground on well pads and roads, no green belts other than ruderal grasses and forbs, and no planted vegetation.

Sensitive Natural Communities

Three sensitive natural communities occur within the project area: Great Valley mesquite scrub, Valley saltbush scrub, and Valley sink scrub. One of these plant communities, Valley saltbush scrub, was observed on site during the reconnaissance surveys. There were no mesquite (*Prosopis glandulosa torreyana*) trees/shrubs, and thus no Great Valley mesquite scrub, observed within the project area during reconnaissance surveys. Similarly, alkali-tolerant plant species characteristic of Valley sink scrub were not observed within the project area. Valley saltbush scrub was observed throughout the project area, predominantly as highly isolated fragments amongst the previously disturbed pipeline route within the oil and gas development.

Great Valley Mesquite Scrub

Great Valley Mesquite Scrub is represented by open woodlands or savannas dominated by honey mesquite and allscale. The understory is grassy in good rainfall years, though usually dominated by introduced annuals. Perennial cover is usually low, with honey mesquite densities as low as two to three plants per acre. This vegetation type is present on sandy loams of alluvial origin, often with wind-modified micro-topography and high-water table (Holland 1986, Code: 63420). Great Valley mesquite scrub historically occurred in the southern San Joaquin Valley from Bakersfield to the Inner South Coast Range at Tupman and Buena Vista Lakes.

Valley Saltbush Scrub

Valley saltbush scrub is dominated by woody shrubs and may vary in density and composition based on factors such as soil, drainage, slope, and elevation. Valley saltbush scrub is represented by open, gray or blue-green chenopod scrubs (10 to 40 percent cover), usually over a low herbaceous annual understory. It is dominated by common saltbush, arrowscale saltbush, spiny saltbush, alkali heath, cheesebush, and Bakersfield cactus (Holland 1986, Code: 36220). This vegetation type is present typically on sandy to loamy soils without surface alkalinity; largely on rolling, dissected alluvial fans with low relief. Valley saltbush scrub is known to historically occur from the southern and southwestern San Joaquin Valley and the Carrizo Plains of San Luis Obispo County. Valley saltbush scrub was observed throughout the project area, predominantly as highly isolated fragments amongst the previously disturbed pipeline route within the oil and gas development.

Valley Sink Scrub

Valley sink scrub is lowland scrub habitat dominated by specialized, highly alkali-tolerant succulents with little or no associated understory vegetation (Holland 1986 Code: 36210). Other salt-tolerant plants such as salt grass, Jared's peppergrass, and a number of special status plants may occur within these sink areas. Alkali-tolerant plant species characteristic of Valley sink scrub were not observed within the project area. The nearest occurrence of this habitat is 5 miles north of the northern terminus of the project area, east of the California aqueduct.

Critical Habitat

The project area does not overlap with any federally designated habitat. As shown in Figure 4.4-2, the nearest habitat is for the Buena Vista ornate shrew approximately 10 miles to the east.

Wetlands and Waters

Formal delineation of the NHD- and NWI-identified water features was not conducted for the project area. However, a query of NHD and NWI databases indicated several water features may intersect the project footprint. Many of the identified water features appeared to be ephemeral drainages during the site surveys. Results of the features indicated by NHD and NWI databases is shown on Figure 4.4-3.

Wildlife Refuges and Protected Habitat Areas

California Resources Corporation (CRC) has a Conservation Area Management Plan (CAMP) that governs the Elk Hills Conservation Area. This area was established in fulfillment of the Biological Opinion issued by the U.S. Fish and Wildlife Service (USFWS) in 1995 (I-95-F-102). This was certified by the Wildlife Habitat Council, which includes operation practices to protect unique plant and animal species and cultural resources located in the Elk Hills and western portion of Kern County, as identified in the conservation easement granted by the Wildlife Conservation Board to "the State of California." The conservation easement is to be acted through by the California Natural Resource Agency, Department of Fish and Wildlife (CDFW) subdivision. The purposes of this conservation easement are to ensure that the property will be retained forever in its natural condition and to prevent any use of the property that will significantly impair or interfere with the conservation values of the property (Appendix C-2).

The project area is located within the planning area of the Recovery Plan for Upland Species of the San Joaquin Valley, California. The Valley floor planning area spans from Sacramento and includes southern areas passed Bakersfield and accounts for 34 San Joaquin Valley species listed as federally protected or as candidates or species of concern. The planning area is 430 miles long and covers about 15 million acres. Its floor below the approximate 500-foot contour measures about 8.5 million acres and extends about 258 miles north–south. West of the Valley proper, hills below about 3,000 feet and high plains support natural communities in common with much of the Valley floor.

Figure 4.4-2: Critical Habitat in the Project Vicinity

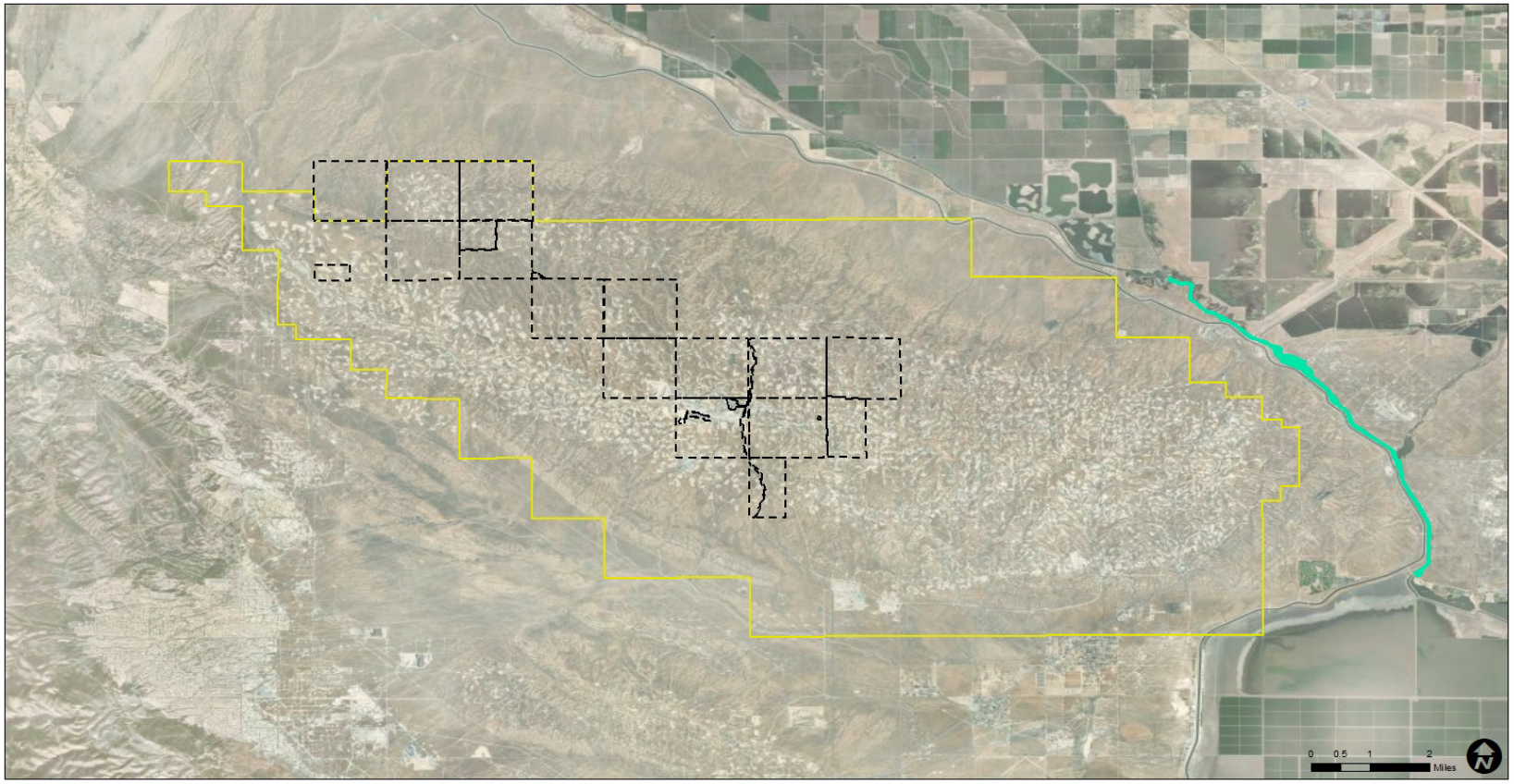

Figure 4.4-3: National Wetlands Inventory and National Hydrography Dataset Records of Aquatic Resources

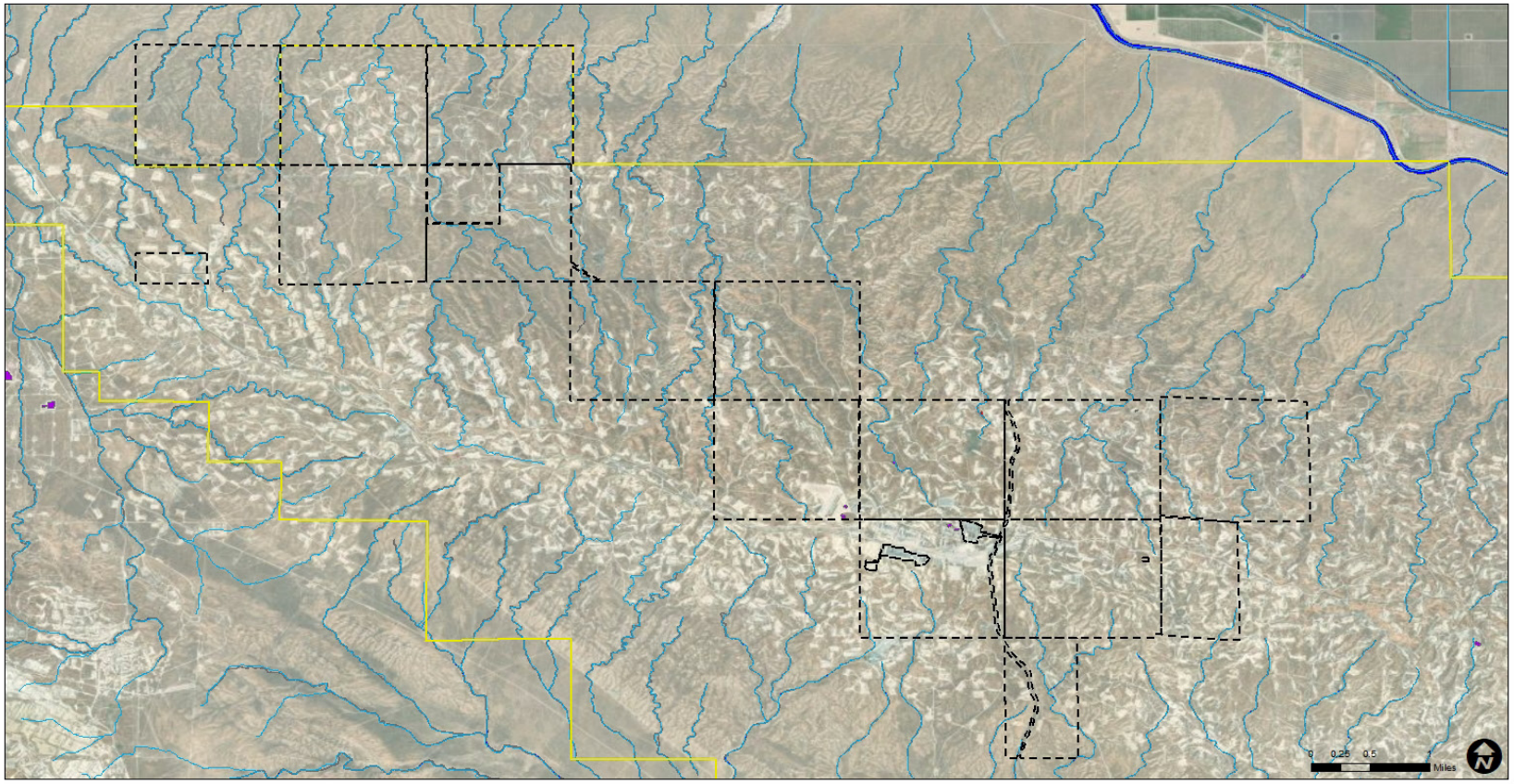

FIGURE 4.4-4: NWI and NHD Records of Aquatic Resources

Draft Environmental Impact Report
Carbon TerraVault I Project

Plant and Wildlife Species Summary

This section summarizes the special status plant and wildlife species that may potentially occur in the project area. Biological resources were observed within the project area, and the potential for the project area to support other sensitive biological resources was evaluated. Assessments for the potential occurrence of special status species are based upon known ranges, species habitat preferences, species occurrence records from the CNDDB, CNPS, IPaC, eBird, VertNet, and species occurrence records from other studies in the survey area, and the results of the surveys of the project area.

There were 27 special status plant and animal species determined to have potential to occur on site and potentially be affected by the project (Tables 4.4-2 and 4.4-3). Plants and wildlife occurring within the project area was typical of developed oil fields of western Kern County. Bird species included common raven (*Corvus corax*), white-crowned sparrow (*Zonotrichia leucophrys*), and red-tailed hawk (*Buteo jamaicensis*). Reptile species included common side-blotched lizard (*Uta stansburiana*) and coastal whiptail (*Aspidoscelis tigris*). Mammal species included San Joaquin antelope squirrel (*Ammospermophilus nelsoni*), black-tailed jackrabbit (*Lepus californicus*), and coyote (*Canis latrans*). A complete list of wildlife observed is included in Appendix C-1.

Special Status Plant Species

Special status plant species are defined herein as those that are listed as threatened and/or endangered by the USFWS or the CDFW, designated as a species of special concern (SSC) or locally significant by the CDFW, fully protected under state law, or species that meet the definitions of rare or endangered under California Environmental Quality Act (CEQA) Sections 15380(b) and (d). The status and known distributions of special status plant species in the project area were evaluated based on a review of available literature and of federal and state databases, including the CNDDB. Data collected from previous conservation-related studies and projects within the project area were also reviewed. No critical habitat has been designated by the USFWS for any plant species in the project area. Plant species listed as threatened or endangered under the Federal Endangered Species Act (ESA) (Wildlife, 50 Code of Federal Regulations [CFR] § 17.11 and Errata; Plants, 50 CFR §17.12 and Errata, 2002). There were 23 special status plant species known or with potential to occur in the vicinity of the project (Appendix C-1). Of the 23 special status plant species, 10 have a potential to occur on the project site and potentially be affected by the project and are identified in Table 4.4-2.

Table 4.4-2: Plant Special Status Species with Potential to Occur on Site

Species	Status Fed/State ESA CRPR/CDFW	Potentially Affected by Project	Viability Threat?
Heartscale *(Atriplex cordulata var. cordulata)*	-/- 1B.2/-	Yes	No
Lost Hills crownscale *(Atriplex coronata S. Watson var. vallicola)*	-/- 1B.2/-	Yes	No
California jewelflower *(Caulanthus californicus)*	FE/SE 1B.1/-	Yes	No
Recurved larkspur *(Delphinium recurvatum)*	-/- 1B.2/-	Yes	No
Kern mallow *(Eremalche kernensis)*	FE/- 1B.2/-	Yes	No
Temblor buckwheat *(Eriogonum temblorense)*	-/- 1B.2/-	Yes	No
Tejon poppy *(Eschscholzia lemmonii ssp. kernensis)*	-/- 1B.1/-	Yes	No
Showy golden madia *(Madia radiata)*	-/- 1B.1/-	Yes	No
San Joaquin woollythreds (*Monolopia congdonii*)	FE/- 1B.2/-	Yes	No
Oil neststraw *(Stylocline citroleum)*	-/- 1B.1/-	Yes	No

California Rare Plant Rank (CRPR):
- 1A Presumed Extinct in California
- 1B Rare, Threatened, or Endangered in California and Elsewhere
- 2A Plants Presumed Extirpated in California, but More Common Elsewhere
- 2B Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere

CRPR Threat Code Extension:
- .1 Seriously Endangered in California (Over 80% of Occurrences Threatened / High Degree and Immediacy of Threat)
- .2 Fairly Endangered in California (20 to 80% Occurrences Threatened)
- .3 Not Very Endangered in California (<20% of Occurrences Threatened)

Federal Ranking
- FE Federally Endangered
- FT Federally Threatened

State Ranking
- SE State Endangered
- ST State Threatened
- SCE State Candidate Endangered
- SFP State Fully Protected
- SSC State Species of Special Concern

Heartscale. The heartscale is an annual herb endemic to California and currently has the California Rare Plant Rank (CRPR) status of 1B.2. Heartscale is found in saline and alkaline soils, chenopod scrub, meadows and seeps, and sandy soils in valley foothill grassland habitats between sea level and 1,835 feet. occur in Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Madera, Merced, San Joaquin, Solano, Stanislaus, Tulare, and Yolo counties. This species is threatened by

competition from non-native plants and possibly threated by trampling. Heartscale blooms from April to October.

The project is within known range of the species and suitable habitat, saltbush scrub and annual grassland, is present throughout the project area. There are five CNDDB occurrences within 10 miles of the project area, though none are from within the last decade. The most recent occurrence dates to 2003, approximately 6 miles southeast of the project area where the species was observed in habitat along State Route 119.

Low Hills Crownscale. The Lost Hills crownscale is an annual herb endemic to California that currently has the CRPR status of 1B.2. The Low Hills Crownscale is found in dry beds of alkaline pools in chenopod scrub, valley and foothill grassland, and vernal pools. It is also found on exposed slopes rich in gypsum. It occurs at elevations ranging from 165 to 2,085 feet. Lost Hills crownscale is an annual herb endemic to California that blooms between April and September. The project is within known range of the species and suitable habitat, saltbush scrub and annual grassland, is present throughout the project area. There are multiple CNDDB records within 10 miles of the project area; the nearest dates to 2000 and is approximately 1.30 miles southeast of the project area, where the species was observed in saltbush scrub habitat within the Elk Hills oilfield.

California Jewelflower. The California jewelflower is federally and state endangered and has a CRPR 1B.1 status. Suitable habitat for the California jewelflower consists of slightly alkaline sandy soils in chenopod scrub, valley and foothill grassland, and pinyon and juniper woodland, typically at elevations from approximately 200 to 3,280 feet. The California jewelflower is an annual herb which typically blooms between February and May. There are two CNDDB occurrences within 10 miles of the project area, although both are presumed extirpated and neither are from within the last decade. The occurrences are approximately 8.60 miles northwest and 4.75 miles southeast of the project area, respectively. As the project area contains similar habitat to the nearby records (prior to their extirpation) there is potential for the species to occur.

Recurbed Larkspur. The Recurbed larkspur currently has a CRPR 1B.2 status. A perennial herb, the Recurbed larkspur typically occurs in alkaline conditions in chenipod scrub, cismontane woodland and valley and foothill grassland habitats between the elevations of 10 and 2,590 feet. Suitable habitat including saltbush scrub and annual grassland is present throughout the project area. In addition to the multiple CNDDB occurrences documented within a 10-mile radius, one occurrence overlaps the northern terminus of the project area.

Kern Mallow. The Kern mallow is an annual herb that begins to bloom between January until May and currently has a CRPR 1B.1 status. It is found on dry, open sandy to clay soils, often at the edges of balds in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland. It occurs at elevations ranging from approximately 230 to 4,230 feet. There are multiple CNDDB occurrences from the last decade within 10 miles of the project area. The most recent occurrence is from 2020 where the species was observed within the Elk Hills oilfield approximately 2.78 miles northeast of the southern terminus of the project area.

Temblor Buckwheat. Temblor buckwheat is an annual herb that typically blooms from May to September, but sometimes as early as April. The Temblor buckwheat has a CRPR 1B.1 status. It occurs in clay and sandstone substrate in valley and foothill grassland habitats. It occurs at elevations from approximately 98 to 3,280 feet. The project near the known range of the species and suitable habitat, annual grassland, is present in limited areas within the project area. There are two CNDDB occurrences within 10 miles of the project area, the nearest of which dates to 2011 and is approximately 0.85 miles north of the northern terminus of the project area. Because of the proximity of the project area to the known range of the species and the recent CNDDB occurrence within one mile of the project area, this species was considered to have potential to occur.

Tejon Poppy. Tejon poppy is an annual herb that blooms in March (sometimes as early as February) to May and currently has a CPRP 1B.1 status. It is found in open valley and foothill grasslands and chenopod scrub at elevations from approximately 450 to 4,500 feet. The project is within the known range for the species and suitable habitat, saltbush scrub and annual grassland, is present throughout the project area. There are multiple CNDDB occurrences within 10 miles of the project area, several of which are from within the last decade and one of which overlaps the project area. The overlapping CNDDB occurrence dates to 1998 and is located approximately midway along the proposed project route.

Showy Golden Madia. Showy golden madia is an annual herb endemic to California that blooms between March and May and currently has a CRPR 1B.1 status. It is found in cismontane woodland and valley and foothill grassland habitats with grassy or open slopes, usually on adobe or gypseous clay soils, at elevations from approximately 80 to 3,985 feet. The project is within the known range of the species and suitable habitat, annual grassland, is present in limited areas within the project area. There are two CNDDB occurrences (EONDX 2732 and 7469) within 10 miles of the project area; both date to 1992 and are located approximately 5.32 miles north of the project area, where the species was observed adjacent to the California aqueduct within disturbed saltbush scrub habitat.

San Joaquin Woolly-threads. San Joaquin woolly-threads is an annual herb endemic to California that blooms from February to May. The San Joquin woolly-thread is a federally endangered plant species and has a CRPR 1B.2 status. It is found in chenopod scrub and on sandy soils in valley and foothill grassland. It occurs at elevations from approximately 196 to 2,624 feet. The project is within the known range for the species and suitable habitat, saltbush scrub and annual grassland, is present throughout the project area. There are four CNDDB occurrences within 10 miles of the project area, the nearest of which dates to 1988 and is located 3.42 miles southwest of the project area, where the species was observed within an oilfield in saltbush scrub habitat.

Oil Nestraw. Oil nestraw is an annual herb endemic to California that blooms from March to April and has a CRPR 1B.1 status. It is found on clay substrates in chenopod and coastal scrub, and valley and foothill grasslands. It occurs at elevations from approximately 164 to 1,312 feet and is possibly threatened by energy development and urbanization. There are multiple CNDDB occurrences within 10 miles of the project area, two of which overlap the project area. Both overlapping CNDDB records date to 2001 when the species was observed within saltbush scrub habitat.

Special Status Animal Species

Literature review identified 40 special status animal species with the potential to occur in the vicinity of the project area (Appendix C-1). Of the 40 special status species, 17 (identified in Table 4.4-3) have a potential to occur on the project site and a potential to be affected by the project. The potential for these species to occur was determined based on the presence of suitable habitat within species' known range and/or historical documentation of the species in or near the project area.

Table 4.4-3: Special Status Animal Species with Potential to Occur on Site

Species	Status Fed/State ESA CRPR/CDFW	Potentially Affected by Project	Viability Threat?
Invertebrates			
Crotch bumble bee (*Bombus crotchii*)	-/SCE -/-	Yes	No
Reptiles			
California glossy snake (*Arizona elegans occidentalis*)	-/- -/SSC	Yes	No
Blunt-nosed leopard lizard (*Gambelia sila*)	FE/SE -/SFP	Yes	No
San Joaquin coachwhip (*Masticophis flagellum ruddocki*)	-/- -/SSC	Yes	No
Coast horned lizard (*Phrynosoma blainvillii*)	-/- -/SSC	Yes	No
Temblor legless lizard *(Anniella alexanderae)*	-/SCE -/-	Yes	Unknown
Birds			
Burrowing owl (*Athene cunicularia*)	-/- SSC	Yes	No
Swainson's hawk (*Buteo swainsoni*)	-/ST -/-	Yes	No
Prairie falcon (*Falco mexicanus*)	-/- -/WL	Yes	No
Loggerhead shrike (*Lanius ludovicianus*)	-/- -/SSC	Yes	No
Le Conte's thrasher (*Toxostoma lecontei)*	-/- -/SSC	Yes	No

Table 4.4-3: Special Status Animal Species with Potential to Occur on Site

Species	Status Fed/State ESA CRPR/CDFW	Potentially Affected by Project	Viability Threat?
Mammals			
Nelson's (=San Joaquin) antelope squirrel (*Ammospermophilus nelson*)	-/ST -/-	Yes	No
Giant kangaroo rat (*Dipodomys ingens*)	FE/SE -/-	Yes	No
Short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus*)	-/- -/SSC	Yes	No
Tulare grasshopper mouse (*Onychomys torridus tularensis*)	-/- -/SSC	Yes	No
San Joaquin pocket mouse (*Perognathus inornatus*)	-/- -/-	Yes	No
American badger (*Taxidea taxus*)	-/- -/SSC	Yes	No
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE/ST -/-	Yes	No

California Rare Plant Rank (CRPR):
- 1A Presumed Extinct in California
- 1B Rare, Threatened, or Endangered in California and Elsewhere
- 2A Plants presumed extirpated in California, but More Common Elsewhere
- 2B Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere

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Federal Ranking
- FE Federally Endangered
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State Ranking
- SE State Endangered
- ST State Threatened
- SCE State Candidate Endangered
- SFP State Fully Protected
- SSC State Species of Special Concern

Crotch's Bumblebee. Crotch's bumblebee occurs in relatively warm and dry environments, including the inner Coast Range of California and the margins of the Mojave Desert. It inhabits grassland and scrub habitats, where it nests in abandoned rodent burrows, occasionally nesting above ground in tufts of grass, rock piles, or cavities in dead trees. This species is classified as a short-tongued species, whose food plants include Asclepias, Chaenactis, Lupinus, Medicago, Phacelia, and Salvia. There are three CNDDB occurrences within 10 miles of the project area, the nearest of which overlaps the southern end of the project area, although it dates to 1957 and is mapped generally. A Calflora query for occurrences of suitable host plants, within the genera Asclepias, Chaenactis, Lupinus, Medicago, Phacelia, or Salvia, resulted in six documented occurrences within the vicinity of the project area, none of which were observed within the last 40 years. The species was not observed during reconnaissance surveys. The project is located within

the known range of the species and suitable habitat, abandoned rodent burrows within scrub habitat, is present.

California Glossy Snake. This subspecies of glossy snake occurs from the eastern part of the San Francisco Bay south to northwestern Baja, California. It appears to prefer microhabitats of open areas with soil loose enough for easy burrowing. It inhabits arid scrub, rocky washes, grasslands, and chaparral. This species is nocturnal and hides under rocks and in existing burrows or creates its own burrow during daylight hours. It is usually active from late February until November. Although the species was not observed during reconnaissance surveys, the project is located within the known range of the species and suitable habitat is present. There are seven CNDDB occurrences of this species within 10 miles of the project area. The nearest occurrence dates to 2015 and is located approximately 2.46 miles west of the project area, where the species was observed within habitat adjacent to State Route 58.

Blunt-nosed Leopard Lizard. The blunt-nosed leopard lizard is listed as a federal and state endangered species and is a state fully protected species. It is included in the San Joaquin Valley Recovery Plan. This species is characterized by a short blunt snout. It is grayish yellow with dark spots arranged in rows and has distinct pale cross-bands along on its body. It has a distinct head and is relatively large in comparison to other lizard species in its range. Young individuals and breeding females develop reddish-orange spots on their bodies that aid in identification of the species. Breeding males generally have a broader head and display a pink to salmon color on their throat and chest and sometimes over their entire body.

This species occurs in semiarid habitats within the southern Central Valley, Cuyama Valley, and Panoche Valley, at elevations between 100 and 2,400 feet. Preferred habitats are typically flat, sparsely vegetated grasslands with large open areas with scattered shrubs for cover, and sandy washes. The species spends most of the year underground in abandoned small mammal burrows, with adults surfacing in the spring and early summer to breed and feed. Young hatch in July and August. Both adults and young recede to refugia between August and November and then spend the winter there. Although the species was not observed during reconnaissance surveys, the project is located within the known range of the species and suitable habitat is present. There are multiple CNDDB occurrences within 10 miles of the project area, although none overlap the project area. The nearest CNDDB occurrence dates to 2017 and is approximately 0.65 miles northwest of the project area where the species was observed in saltbush scrub habitat.

Protocol-level blunt-nosed leopard lizard surveys and pre-construction surveys were conducted approximately 3 miles southwest of the project area in 2019. The surveys resulted in 10 blunt-nosed leopard lizard detections. The pre-construction surveys that were conducted for oil well rework resulted in negative findings. Additionally, extensive pre-activity surveys were conducted in wide-ranging areas of Elk Hills during a six-year period from 2001 through 2005. Monitoring of the Elk Hills Conservation Area has been conducted semi-annually from 1999 through the present, which consists of conducting spotlight and track station surveys, and small mammal trapping for monitoring the prey base of the San Joaquin kit fox. During these pre-activity and monitoring surveys, there were 475 detections of the blunt-nosed leopard lizard.

San Joaquin Coachwhip. The San Joaquin coachwhip has SSC status. This species is around 43 inches in length, is slender in girth, and has a large head in comparison to the size of its body. The San Joaquin whipsnake occurs in open, dry, treeless areas, including grasslands and saltbush scrub habitat between 60 and 3,000 feet in elevation. This species takes refuge in rodent burrows, under shaded vegetation, and under surface objects such as woody debris, rocks, and boards. This species is endemic to California, ranging from Colusa County in the Sacramento Valley southward to the Grapevine in the Kern County portion of the San Joaquin valley and westward into the inner South Coast Ranges. The San Joaquin coachwhip occurs in open, dry, treeless areas with little or no cover, including valley grassland and saltbush scrub, desert scrub, chaparral, pasture, and open pine and oak woodlands, and avoids areas of dense vegetation where their mobility can be hindered. San Joaquin coachwhips are found below 7,700 feet in elevation. This species was not observed during reconnaissance surveys; however, the project is located within the known range of the species and suitable habitat is present. There are seven CNDDB occurrences within 10 miles of the project area. The nearest CNDDB occurrence to the project area dates to 2017 and is approximately 0.93 miles to the west where the species was observed at an oil field sump site.

Coast Horned Lizard. The Coast horned lizard has SSC status. This species is described as a flat-bodied lizard with a wide oval-shaped body, scattered enlarged pointed scales on the upper body and tail, and a large crown of horns or spines on the head. The two center horns are the longest, and each side of the body has two rows of pointed fringe scales. Each side of the throat has two to three rows of enlarged pointed scales as well. The coast horned lizard can be reddish, brown, yellow, or gray with dark blotches on the back and large dark spots on the sides of the neck. The belly is cream, beige, or yellow, usually with dark spots, and the belly scales are smooth. Habitat requirements for the Coast horned lizard are sandy, loose soils in grasslands, forests, woodlands, and open chaparral. Individuals are often found along sandy washes and dirt roads with scattered shrubs for cover and found in coastal California from Baja California north to the Bay Area, southeastern desert regions, southern Central Valley flats and foothills, and the surrounding mountains on drier, warmer slopes, at elevations up to 8,000 feet. The Coast horned lizard was not observed during reconnaissance surveys. The project is located within the known range of the species and suitable habitat is present. This species was observed within 5 miles of the project site during a survey within Elk Hills by QK in 2022. However, there are no CNDDB records within 10 miles of the project area.

Temblor Legless Lizard. The Temblor legless lizard is differentiated from all other species of *Anniella* in having a light gray ventral coloring that is continuous from the lower jaw to the end of the tail. The lizard is a unique, limbless lizard endemic to the alkali desert scrub and annual grasslands of the southwestern San Joaquin Valley, east of the Temblor mountains at elevations of 551 to 1,529 feet. This burrowing and crepuscular (active at dawn and dusk) species uses the ground surface, soil, and leaf litter for feeding and mating. Temblor legless lizards eat larval insects, adult beetles, termites and spiders. Threats include habitat loss due to development, urbanization, agriculture, climate change, and invasive species. Habitat loss, degradation, and fragmentation can restrict the species' ability to feed, burrow and reproduce. On November 18, 2021, the Center for Biological Diversity submitted a petition to the California Fish and Game Commission to list the Temblor legless lizard as a threatened or endangered species under the California Endangered Species Act (CESA). The Commission published findings of its decision to advance the species to

candidacy on July 1, 2022, and as such, Temblor legless lizard now receives the same legal protection afforded to an endangered or threatened species (California Fish and Game Code [CFGC] Sections 2074.2 and 2085) (CDFW 2022). As discussed in Impact 4.4-1, potential impacts were evaluated based on the potential occurrence of the species in the project area.

Burrowing Owl. The Burrowing owl has an SSC status. The Burrowing owl's body is generally brown with speckles of white. The owl's breast is a lighter color brown and its face is encircled in white, with tinges of sandy brown feathers. Its wings are about the same size as its body; its legs are featherless, and it has round yellow eyes. It can be found in a variety of habitat types including grasslands, deserts, or other open habitats containing treeless areas with low vegetation cover and gently sloping terrain, where food resources are available. Burrowing owls use earthen burrows, typically relying on other fossorial mammals to construct their burrows, such as prairie dog (*Cynomys ssp.*) or American badger. In Florida, burrowing owls are capable of digging their own burrows. In California, they are associated with California ground squirrels. They use a burrow throughout the year for temperature regulation, offspring rearing, shelter, and escape from predators. Although their burrows are most often earthen, burrowing owls have been documented using atypical burrows such as pipes, culverts, and other man-made structures, most often as shelter. Burrowing owls can have several burrows close to one other that they may use frequently to avoid predators. The project is located within the known range of the species and suitable habitat is present. There are multiple CNDDB occurrences within 10 miles of the project area; the nearest dates to 2000 and is approximately 2.10 miles southeast of the southern terminus of the project area, where an adult was observed at a burrow site within the Elk Hills oilfield. Two burrows displaying diagnostic signs (white-wash, pellets, feathers) were observed at the northern end of the project area.

Swainson's Hawk. The Swainson's hawk is mostly white underneath with a dark red bib along its chin and upper chest. The throat and face both have a white patch, and the tips of the feathers are distinctly tipped with black. Swainson's hawks forage in grasslands, grain and alfalfa fields, and livestock pastures. Swainson's hawks occur in grassland, desert, and agricultural landscapes throughout the Central Valley and Antelope Valley. Some hawks may be resident, especially in the southern portion of their range, while others may migrate between winter and breeding habitats. They prefer larger isolated trees or small woodlots for nesting, usually with grassland or dryland grain fields nearby for foraging and have been known to nest in large eucalyptus trees (*Eucalyptus sp.*) along heavily traveled freeway corridors. Breeding occurs between late March and late August, with peak activity occurring during late May through July. Swainson's hawks forage in grassland, open scrub, pasture, and dryland grain agricultural habitats, primarily for rodents. Swainson's hawks exhibit a moderate to high nest site fidelity for successful nest sites. Swainson's hawk was not observed during the reconnaissance survey. No suitable nesting sites were observed within the project area during site surveys, but inactive stick nests capable of supporting the species were observed nearby, and areas of open saltbush scrub within the project area could provide foraging opportunities for the species. There are six CNDDB occurrences within 10 miles of the project area, the nearest (EONDX 91375) is from 2017 and is located approximately 4.37 miles north of the project area where a nest was observed in a large tamarisk tree.

Prairie Falcon. The Prairie Falcon is on the California State Watch List. This species is a widely distributed species that occurs all over the world. It breeds in open landscapes with cliffs or skyscrapers for nest sites. It nests at elevations up to 12,000 feet, as well as along rivers, coastlines, cities, transmission towers, silos, quarries, and bridges. Although the species was not observed during reconnaissance surveys, the project is located within the known range of the species, and while no suitable nesting sites were observed within the project area, suitable foraging habitat was observed. There is a single CNDDB, which is from 1989 and overlaps the project area, although it is mapped generally as the exact location has been suppressed from the record.

Loggerhead Shrike. The Loggerhead shrike has a status of being a state SSC. This species is identifiable based on its gray back, white belly, black coloration on the wings, and a black mask around the eyes. Habitat requirements for the Loggerhead shrike include open grassland and pasture habitats with scattered trees. The Loggerhead shrike can also be found at fence posts, utility lines, small shrubs or other perches. This species primarily consumes large insects but will prey upon other small animals. It nests in densely foliaged and/or thorny shrubs and trees less than 50 feet above the ground. Although the species was not observed during reconnaissance surveys, the project is located within the known range of the species and both suitable nesting and foraging habitat is present. There is a single CNDDB occurrence within 10 miles of the project area, which is from 1999 when six adults and two juveniles were observed within saltbush scrub habitat. The CNDDB occurrence is located approximately 2.32 miles southwest of the northern terminus of the project area.

Le Conte's Thrasher. The Loggerhead shrike has a status of being a state SSC. It is a medium sized songbird with a long, nearly black 4.7-inch-long tail. This species has a distinctly de-curved 1-inch-long black bill. The Le Conte's thrasher has a plain grayish or sandy colored body without wing bars or spots. The eye is dark and lacks a distinct stripe above the eye. The dark tail contrasts sharply with the much paler body. Le Conte's thrasher is an uncommon-to-rare local resident in southern California deserts. It occurs in open desert wash, desert scrub, alkali desert scrub, desert succulent scrub, and Joshua tree habitat with scattered shrubs. It occurs from Mono County south to the Mexican border and in western and southern San Joaquin Valley. It has rarely been recorded north of Kern County after the 1950s. It feeds on insects and occasionally on seeds, small lizards, and other small vertebrates. This species is threatened by loss of habitat due to oil and gas production, overgrazing, and pesticides (dichlorodiphenyltrichloroethane [DDT]). Although the species was not observed during reconnaissance surveys, the project is located within the known range of the species and both suitable nesting and foraging habitat is present. There are multiple CNDDB occurrences within 10 miles of the project area, the nearest is from 1999 and is located approximately 1.50-miles west of the northern terminus of the project area where two adults were observed in saltbush scrub habitat within oil and gas development.

San Joaquin Antelope Squirrel. The San Joaquin antelope squirrel is listed as a state threatened species. The San Joaquin antelope squirrel is of a typical ground squirrel shape with small round ears and a streamlined body and short legs. San Joaquin antelope squirrels occurs in saltbush scrub and grassland habitats and prefers washes and open shrub areas with sandy soils. Known populations occur in Lokern Natural Area, Elk Hills Carrizo and Elkhorn Plains, Temblor Range and foothills and interior valleys of the Diablo Range and as far north as Merced and San Benito

counties. This species can excavate burrows or use kangaroo rat burrows for temperature regulation, litter-rearing, shelter, and escape from predators. The project is located within the known range of the species and suitable habitat is present. There are multiple CNDDB occurrences within 10 miles of the project area, two of which overlap the project area. The most recent overlapping CNDDB occurrence is from 2018 when both adults and juveniles were observed in saltbush scrub habitat. Multiple individuals were observed during the reconnaissance surveys throughout the project area, apart from the highly urbanized area in the southern section. In addition, during the biological field surveys conducted for the Biological Assessment, 19 locations of the species were observed.

Giant Kangaroo Rat. The giant kangaroo rat is federally and state endangered species. The giant kangaroo rat is one of the largest of kangaroo rat species. The giant kangaroo rat is buffy tan in coloration and is distinguished from other coexisting kangaroo rats by size and having five toes on the hind limbs. The giant kangaroo rat is an endemic species in the San Joaquin Valley and adjacent areas. Giant kangaroo rats occur in native annual grassland and shrubland habitats with vegetated annual grass and forbs and scattered desert shrubs typically between elevations of 280 and 2,800 feet. It excavates burrows on level or gentle slopes with friable, sandy, well-drained soils and is a nocturnal foraging species. Focused trapping surveys for this species were not conducted as part of this analysis. However, the project is located within the known range of the species, and suitable habitat is present. The distribution of the giant kangaroo rat in Elk Hills was established in 1980. The information was obtained to establish a conservation plan for Elk Hills. A total of 1,080 giant kangaroo rat burrows were identified, with the highest concentration of burrows occurring in areas devoid of petroleum developments. Isolated burrows were scattered near various disturbances such as well pads, dirt roads, and pipelines.

Extensive pre-activity surveys were conducted in wide-ranging areas of Elk Hills during a six-year period from 2001 through 2005. Monitoring of the Elk Hills Conservation Area has been conducted semi-annually from 1999 through the present, which consists of conducting spotlight and track station surveys, and small mammal trapping for monitoring the prey base of the San Joaquin kit fox. During these pre-activity surveys and monitoring surveys, 1,240 active precincts of the giant kangaroo rat were identified.

There are multiple CNDDB occurrences within close proximity of the project area, one of which overlaps the project area. The overlapping CNDDB occurrence is from 1987 in saltbush scrub habitat. This nocturnal species was not observed during the reconnaissance surveys, however, suitable burrows with diagnostic signs of kangaroo rat were observed.

Short-nosed Kangaroo Rat. The Short-nosed kangaroo rat is federally and state endangered species**.** The short-nosed kangaroo rat is a subspecies of the San Joaquin kangaroo rat (*Dipodomys nitratoides*). The appearance of the short-nosed kangaroo rat is very similar to the Tipton kangaroo rat and the Fresno kangaroo rat. This species occurs on friable soils on flat or gentle slops within grassland or desert scrub habitat. It excavates burrows on higher ground and is a nocturnal foraging species. The project is located within the known range of the species and suitable habitat is present. There are multiple CNDDB occurrences within close proximity of the project area. Additionally, one CNDDB occurrence was found within the project area and consists of a 1990 record in saltbush

scrub habitat. This species was not observed during the reconnaissance surveys, however, suitable burrows with diagnostic sign of kangaroo rat were observed. This nocturnal species was not observed during the reconnaissance surveys, however, suitable burrows with diagnostic signs of kangaroo rat were observed.

Tulare Grasshopper Mouse. Tulare grasshopper mouse has a status of being a state SSC. This species has a stout body with a club-like tail. Individuals are bicolored with the head and upper body pale brown to pink and the underbody is white. The tail is usually bicolored with a white tip. The Tulare grasshopper mouse is primarily carnivorous with a diet consisting of small mammals and insects. The Tulare grasshopper mouse occurs in shrubland communities in hot, arid grassland and shrubland associations. These include blue oak woodlands, upper Sonoran subshrub scrub, alkali sink and mesquite associations on the Valley Floor, and grasslands associations on the sloping margins of the San Joaquin Valley and Carrizo Plain region. This subspecies occupies burrows and feeds primarily on invertebrates but may supplement its diet with seeds and other small mammals. The BAR is located within the known range, with suitable habitat present. There are multiple CNDDB occurrences within 10 miles, with the nearest occurrence including a 1957 record located approximately 0.75 miles north. This species was not observed during the reconnaissance survey, but suitable burrows were observed.

San Joaquin Pocket Mouse. The San Joaquin pocket mouse is located on the California State Special Animal List and is state ranked S2S3. This species is also listed as Bureau of Land Management (BLM) Sensitive. The San Joaquin pocket mouse is a nocturnal species that digs its own burrows for cover, breeding and seed catching. This species is small in size and buffy tan in coloration with a lighter colored belly. The San Joaquin pocket mouse primarily feeds on seeds, but also eats green vegetation and insects. This species inhabits arid annual grasslands, savannas, washes, and desert shrub associations with sand or finely textured soils throughout the San Joaquin Valley. Habitat preferences for this species includes scrublands on fine-textured soils in the Central (mostly west side) and Salinas valleys at elevations from 1,100 to 2,000 feet. The project is located within the known range of the species and suitable habitat is present. There are multiple CNDDB occurrences within 10 miles of the project area, one of which overlaps the project area. The overlapping CNDDB occurrence is from 1991 when there were 172 captures resulting from four trapping periods throughout the year. This species was not observed during the reconnaissance surveys, however potentially suitable burrows were observed within the project area.

American Badger. The American Badger is described as having long brown or black fur with white stripes on its cheeks; one of the stripes extends from the nose to the back of the head. The American badger has a flat body with short legs, a triangular face, and a long-pointed nose. America badgers utilize dens and burrows for sleeping, hunting, storing food, and breeding. Their diet consists primarily of small mammals like ground squirrels, rats, gophers, and mice. The American badger has SSC status. The American badger can typically be found in grasslands, deserts, and drier habitats. Badgers are typically nocturnal and hunt or forage at night while spending daylight hours below ground. Normally, they have a single den entrance that is approximately 8 to 12 inches in width, in an elliptical or half-moon shape, similar to their body shape. Dens are usually found in friable soils, which are easier to dig in. American badgers spend most of their time near a den; however, they many have multiple dens in an area that can be used at the same time. American

badgers are known to be able to dig a new den each night. During cooler nights the entrance to the den may be partially plugged with soil to help regulate temperatures. The project is located within the known range of the species and suitable habitat is present. There are multiple CNDDB occurrences within 10 miles of the project area, the nearest is from 1999 and located approximately one-mile northwest of the project area. This species was not observed during reconnaissance surveys, however dens displaying signs consistent with use of a badger were observed, indicating they may be present within the project area.

San Joaquin Kit Fox. The San Joquin kit fox has a federally endangered and state threatened status. The San Joaquin kit fox is a small fox with a bushy, black-tipped tail. The body is usually a buffy-tan and individuals have long slender legs, and narrow noses. The San Joaquin kit fox is a subspecies of kit fox that is endemic to the Central Valley of California. Individuals of this subspecies are found primarily in the San Joaquin Valley, Carrizo Plain, and Cuyama Valley, as well as other small valleys in the western foothills of the Central valley. They occupy arid to semiarid grasslands, open shrublands, savannahs, and grazed lands with loose-textured soils. The San Joaquin kit fox is also well-established in some urban areas and are highly adaptable to human-altered landscapes. While they may occasionally forage in agricultural habitats, they generally avoid intensively maintained agricultural land due to repeated ground disturbance. This species uses subterranean dens year-round for shelter and pup-rearing. They are nocturnally active but may be visible above ground near their dens during the day, particularly in the spring. The project is located within the known range of the species and suitable habitat is present.

A research paper titled “Movements and Home Ranges of San Joaquin kit Foxes (*Vulpes macrotis mutica*) Relative to the Oil-field Development” compiled the movements of the species, home range size, and spatial patterns of home ranges in developed and undeveloped portions of the oilfields to determine if the oil-field development has affected the size of the home ranges and the spatial organization of the ranges (Zoellick et al. 2002). By using radiotelemetry, San Joaquin kit foxes were tracked from July 1984 to September 1985. It was found that the Elk Hills area provided some of the highest-quality habitat remaining for kit foxes in the San Joaquin Valley.The smaller sizes and spatial patterns of the home ranges resulted in higher prey availability.

There were also multiple pre-activity surveys for sensitive resources conducted on Elk Hills in 1999 and 2000 relative to seismic exploration, which included full-time monitoring during exploration activities. The surveys identified 420 potential San Joaquin kit fox dens and five active dens.

Extensive pre-activity surveys were conducted in wide-ranging areas of Elk Hills during a six-year period from 2001 through 2005. Monitoring of the Elk Hills Conservation Area has been conducted semi-annually, which consists of conducting spotlight and track station surveys, and small mammal trapping for monitoring the prey base of the San Joaquin kit fox. During these pre-activity surveys and monitoring surveys, there were 473 detections of the San Joaquin kit fox.

There are multiple CNDDB occurrences within close proximity of the project area, four of which overlap the project area. The most recent overlapping CNDDB occurrence is from 2001 when one individual was observed. Two potential San Joaquin kit fox dens were observed as part of the biological field surveys for the Biological Assessment.

4.4.3 Regulatory Setting

Federal, state, regional, and local biological resource policies and regulations applicable to the proposed project are identified below.

Federal

Federal Endangered Species Act of 1973 (16 United States Code (USC) 1531 through 1543)

The ESA (16 U.S. Code [U.S.C.] 1531 et seq.) was enacted to provide a means by which endangered and threatened species and the ecosystems on which they depend may be conserved. The ESA and the implementing regulations (50 CFR 17.1 et seq.) include provisions for the protection and management of federally listed threatened or endangered plants and animals and their critical habitats. Generally, the USFWS regulates upland and freshwater species, and the National Marine Fisheries Service (NMFS) oversees provisions for protection of anadromous, marine, and estuarine species. Section 4 of the ESA requires the USFWS and/or NMFS to make determinations on whether any species should be listed as an endangered or threatened species and to designate critical habitat for endangered and threatened species (16 U.S.C. 1533). Critical habitat is defined in the ESA as an area occupied by a listed species with physical or geographical/ biological features essential to the species conservation or locations not currently occupied by listed species which are essential to the species conservation. 50 CFR 424.02 Section 9 of the ESA (16 U.S.C. 1538, 50 CFR 17.21402 et seq.) prohibits the unauthorized take of any species that is listed as threatened or endangered under the ESA. Take that is incidental to and not the purpose of the carrying out of otherwise lawful activities may be permitted under Section 7 and Section 10 of the ESA.

Section 7 of the ESA requires federal agencies to consult with the USFWS and/or NMFS and obtain a biological opinion prior to carrying out any federal program or agency action that may adversely affect threatened or endangered species. The ESA Section 7 consultation process and biological opinion includes an evaluation of whether a federal project, including issuance of an incidental take permit (ITP) under ESA Section 10, is likely to jeopardize the continued existence and recovery of any endangered or threatened species or result in the destruction or adverse modification of critical habitat designated for the species. If a proposed federal action would result in take of a listed animal species or adverse modification of designated critical habitat, ESA Section 7 requires the USFWS to provide an incidental take statement that includes reasonable and prudent measures and terms and conditions implementing those measures, to minimize the effects of such take. Compliance by the federal agency and any applicant with the incidental take statement exempts potential take or adverse critical habitat modification resulting from the proposed action from the prohibitions in Section 9 of the ESA.

Section 9 lists actions that are prohibited under the ESA. Although take of a listed species is prohibited, it is allowed when it is incidental to an otherwise legal activity. Section 9 prohibits take of listed species of fish, wildlife, and plants without special exemption. The definition of "harm" includes significant habitat modification or degradation that results in death or injury to listed

species by significantly impairing behavioral patterns related to breeding, feeding, or shelter. "Harass" is defined as actions that create the likelihood of injury to listed species by disrupting normal behavioral patterns related to breeding, feeding, and shelter significantly.

Section 10 of the ESA provides mechanisms for authorizing otherwise prohibited take through the ITP process for a proposed action that does not involve a discretionary approval by a federal agency. Under Section 10(a) of the ESA, an ITP can be obtained provided the permit applicant submits to the USFWS a habitat conservation plan (often termed an HCP, or a multiple species habitat conservation plan when addressing more than one species) that satisfies Section 10(a)(2)(A) of the ESA, and provided the USFWS determines that the habitat conservation plan meets the issuance criteria of Section 10(a)(2)(B) of the ESA. Section 10(a)(2)(B) of the ESA requires the following criteria be met before the USFWS may issue an ITP: (1) The taking will be incidental; (2) The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking; (3) The applicant will ensure that adequate funding for the habitat conservation plan and procedures to deal with unforeseen circumstances will be provided; (4) The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild; and (5) The applicant will ensure that other measures that the USFWS may require as being necessary or appropriate will be provided.

The USFWS is required to annually identify species that are candidates for federal ESA listing, including species that USFWS records indicate are subject to sufficient biological vulnerability and threats to support a proposal for listing but for which a proposal has not been published due to other listing priorities. The list of candidate species is intended to: (1) notify the public that species face survival threats; (2) provide advance knowledge of potential listings for consideration by environmental planners and developers; (3) provide information that may stimulate and guide conservation efforts; (4) request additional input regarding candidate species; and (5) request information for setting listing priorities (Federal Register 79, No. 234 at 72451, December 5, 2014). The USFWS and other federal agencies, including the BLM, may also informally identify sensitive species or species of concern. These species are not subject to ESA or other federal statutory protection but are considered by the USFWS and other agencies when evaluating the effects of a potential action or development resource management plans, including recovery plans under the ESA.

Migratory Bird Treaty Act (16 USC 703 through 712)

The Migratory Bird Treaty Act (MBTA) (16 USC 703–712) includes provisions for the protection of migratory birds and prohibits the non-permitted take of most migratory birds. Take under the MBTA is defined as to "pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any part, nest, or egg of any such bird, or any product, whether or not manufactured" (16 USC 703(a)). Apart from certain limited exceptions, the USFWS has not implemented an ITP program for the MBTA.

Bald and Golden Eagle Protection Act (16 USC 668, enacted by 54 Stat. 250)

The Bald and Golden Eagle Protection Act (BGEPA) of 1940 prohibits any form of possession or take of bald eagles and golden eagles, including actions to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" an eagle (16 USC 668c). To disturb a bald and golden eagle means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (72 FR 31132; 50 CFR 22.3). A 1962 amendment created a specific exemption for possession of an eagle or eagle parts (e.g., feathers) for religious purposes of Indian tribes.

Permits for the incidental, or unintentional, take of these species were first established on November 10, 2009, and then revised in December 2016 (USFWS 2016) and September 2022 (USFWS 2022) by USFWS. The permit regulations authorize the limited take of these species associated with certain otherwise lawful activities, including take in the form of disturbance or actual physical take of eagles (50 CFR 22.26), and the removal of eagle nests (50 CFR 22.27). The regulations establish a hierarchy of take permits that could be issued for specific categories of activity to ensure that the total amount of authorized incidental take does not adversely affect the eagle populations in the western and eastern United States.

The 2016 revisions created a permitting framework for more efficient implementation. USFWS modified the definition of the BGEPA's "preservation standard," which requires that permitted take be compatible with the preservation of eagles. USFWS further removed distinction between standard and programmatic permits, codifying standardized mitigation requirements, and extending the maximum permit duration for eagle incidental take permits (50 CFR 22.26). The regulations also include a number of additional revisions to the eagle nest take regulations at 50 CFR 22.27, as well as revisions to the permit fee schedule at 50 CFR 13.11; new and revised definitions in 50 CFR 22.3; revisions to 50 CFR 22.25 (permits for golden eagle nest take for resource development and recovery operations) for consistency with the § 22.27 nest take permits; and two provisions that apply to all eagle permit types (50 CFR 22.4 and 22.11).

In September 2021, USFWS published an Advance Notice of Proposed Rulemaking seeking input from Tribal governments, the public, and the regulated community on potential approaches for further expediting and simplifying the permit process authorizing incidental take of eagles. In September, 2022, USFWS published a proposed rule (2022) to consider revisions to regulations authorizing the issuance of permits for eagle incidental take and eagle nest take under the Bald and Golden Eagle Protection Act (16 USC 668–668d). The purpose of these revisions is to increase the efficiency and effectiveness of permitting, facilitate and improve compliance, and increase the conservation benefit for eagles. The public comment period for the proposed rule was extended to December 29, 2022, and is currently under review following public comment (USFWS 2022).

The USFWS has indicated that, other than permits for religious and ceremonial activities, BGEPA take permits will generally not be available except for certain "programmatic" activities that may disturb or otherwise take eagles on an ongoing operational basis. To date, programmatic BGEPA permit guidance has been developed by the USFWS for wind and other renewable energy projects, including the development of Avian Protection Plans Eagle Conservation Plans. Programmatic permits are not currently available for residential projects, and a very limited number of programmatic permits for renewable energy development have been issued by the USFWS.

Clean Water Act (33 USC §1251 et seq.)

The federal Clean Water Act (CWA) was enacted to protect the nation's waters. Section 404 of the CWA authorizes the Secretary of the Army, acting through the U.S. Army Corps of Engineers (USACE), to issue permits regulating the discharge of dredged or fill materials into "navigable waters at specified disposal sites." Waters of the United States (WOUS) are defined in CFR, Title 33, Section 328.3, subdivision (a) to include navigable waters, perennial and intermittent streams, lakes, rivers, and ponds, as well as wetlands, marshes, and wet meadows. The CWA extends additional protection to certain sensitive aquatic habitats, including wetlands. Authorization to discharge dredge or fill materials into sensitive aquatic habitats requires that an applicant demonstrate the proposed activity represents the least environmentally damaging practicable alternative for the project. A proposed discharge into federally regulated wetlands must also not result in a net loss of wetland functions or values (USACE, DoD, and EPA 2008). All authorizations to discharge dredge or fill materials into WOUS must demonstrate that the proposed projects have been designed to avoid, minimize and mitigate for all unavoidable effects on water of the United States.

The location and extent of WOUS are formally identified by the USACE through a jurisdictional delineation process applying technical criteria described in various guidance documents issued by the USACE, including the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2) (USACE 2010), *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (Lichvar and McColley 2008), and in USACE Regulatory Guidance Letter No. 05-05 (USACE 2005).

The section 404 permit program also applies to the dredge and fill of federal wetlands. Physically, a federal wetland must meet three specified criteria: (i) less permeable soils more likely to cause rainwater and other surface water flows to pond; (ii) seasonal ponding during specified types of rain events; and (iii) the presence of plants that are consistent with seasonally ponding. The extent to which a wetland area that meets the applicable criteria is federally jurisdictional, however, is subject to considerable legal uncertainty.

On Dec. 30, 2022, the U.S. Environmental Protection Agency (EPA) and Department of the Army (the agencies) announced a final rule founded upon the pre-2015 definition of "waters of the United States," updated to reflect consideration of Supreme Court decisions, the science, and the agencies' technical expertise. The rule restores fundamental protections so that the nation will be closer to achieving Congress' direction in the CWA that our waters be fishable and swimmable. It also

ensures that our waters support recreation and wildlife. In this rule, consistent with the general framework of the 1986 regulations, the agencies interpret the term "waters of the United States" to include:

- traditional navigable waters, the territorial seas, and interstate waters ("paragraph (a)(1) waters");
- impoundments of "waters of the United States" ("paragraph (a)(2) impoundments");

  tributaries to traditional navigable waters, the territorial seas, interstate waters, or paragraph (a)(2) impoundments when the tributaries meet either the relatively permanent standard or the significant nexus standard ("jurisdictional tributaries");
- wetlands adjacent to paragraph (a)(1) waters, wetlands adjacent to and with a continuous surface connection to relatively permanent paragraph (a)(2) impoundments, wetlands adjacent to tributaries that meet the relatively permanent standard, and wetlands adjacent to paragraph (a)(2) impoundments or jurisdictional tributaries when the wetlands meet the significant nexus standard ("jurisdictional adjacent wetlands"); and
- intrastate lakes and ponds, streams, or wetlands not identified in paragraphs (a)(1) through (4) that meet either the relatively permanent standard or the significant nexus standard ("paragraph (a)(5) waters").

In addition, this rule codifies several exclusions from the definition of "waters of the United States," including longstanding exclusions for prior converted cropland and waste treatment systems, and for features that were generally considered non-jurisdictional under the pre-2015 regulatory regime (EPA 2023).

State

California Endangered Species Act (California State Fish and Game Code §2050 et seq.)

The CESA (CFGC 2050 et seq.) is intended to conserve, protect, restore, and enhance any state-protected endangered or threatened species and its habitat and is implemented by the CDFW. CESA prohibits the unauthorized take of species listed as threatened or endangered under the act. Take under state law is defined as actions to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" a state-listed species (CFGC Section 86). The CFGC authorizes the take of endangered, threatened, or candidate species through an ITP that may be issued by the CDFW under Section 2081. Alternatively, an incidental take of CESA-listed species may be authorized under Section 2080.1, which allows the CDFW to find that an ITP issued under the federal ESA is consistent with CEQA state take permit requirements.

CDFW also maintains lists of SSC. An SSC designation is administrative in nature and does not create a formal legal status. CDFW has indicated that SSC designations are intended to: (1) focus attention on at-risk animals identified by state, local, and federal entities; land managers; planners;

consulting biologists; and others; (2) stimulate species research; and (3) stimulate conservation measures that would avoid a CESA listing.

California State Fish and Game Code §1600-1616

Sections 1600 to 1616 of the CFGC states that it is unlawful to "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" without first notifying CDFW of that activity. If CDFW determines and informs the project proponent that the activity will not substantially adversely affect any existing fish or wildlife resources, the activity may be undertaken without further permitting. If CDFW determines that the proposed activity may substantially and adversely affect an existing fish or wildlife resource, a Lake or Streambed Alteration Agreement must be completed and approved by the CDFW, including reasonable measures necessary to protect the affected resources may be required prior to initiating the proposed activity (CFGC 1602).

State Waters (Water Code Section 13000 et seq.)

The Porter-Cologne Water Quality Control Act (Porter-Cologne) provides the State and Regional Boards with the authority to regulate discharges of waste to wetlands or other waters of the state. Section 13050(e) of the Water Code defines waters of the state to mean "any surface water or groundwater, including saline waters, within the boundaries of the state." Discharges of waste have been construed to include fill, any material resulting from human activity, or any other discharge that may directly or indirectly impact waters of the state. All WOUS in California are also waters of the state. Non-federal waters, including wetlands or waters that the USACE has delineated as isolated from federally regulated rivers or streams, are regulated by the State and Regional Boards under Porter-Cologne. State jurisdiction over waters of the state is broader in scope than federal jurisdiction of WOUS in California.

In general, the Porter Cologne Act requires that all parties proposing a discharge that could affect waters of the state file a report of waste discharge with the applicable regional board. The regional board may either issue waste discharge requirements (WDRs), including conditions and measures to protect waters of the state in a public hearing, or may waive the issuance of WDRs with or without additional discharge conditions. As discussed above, Section 4012 of the federal CWA requires state agencies certification that a proposed permit for the fill of a WOUS complies with state water quality objectives. In some instances, the state definition of a water may be larger in size and/or broader in scope than the definition used for federal CWA delineation purposes. Most regional boards utilize the 401 certification process to determine whether additional WDRs may be required for impacts to waters of the state that are not addressed by a proposed federal fill permit. Discharges to waters of the state that are not federally regulated require compliance with the Porter-Cologne discharge notice and WDR issuance process. Many regional boards have adopted criteria for the issuance of WDRs that are similar to federal CWA Section 404 permit requirements, including the need to demonstrate a project has been designed to avoid, minimize, and mitigate for unavoidable effects to waters of the state and would not result in a net loss of wetlands.

The State Board is considering the adoption of a Wetland and Riparian Area Protection Policy in three phases (State Board Resolution No. 2008-0026) in three phases. Phase 1, the "Wetland Area

Protection and Dredge and Fill Permitting Policy," is currently under review by the Board and includes a proposed wetland definition, delineation methods, an assessment framework for collecting and reporting aquatic resource information, and requirements applicable to discharges of dredged or fill material. A draft policy, draft regulation text, and CEQA analysis of the Phase 1 proposal remain pending.

California State Fish and Game Code §§ 3503, 3503.5 and 3513 (Raptors and Migratory Birds)

Several provisions of the CFGC protect avian species, nests, and eggs. Section 3503 provides that it is unlawful "to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Section 3503.5 extends these statutory protections more specifically to raptors and birds of prey (Falconiformes or Strigiformes). The CDFW has not implemented ITP programs for Sections 3503 or 3503.5. Section 3513 makes it unlawful to "possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Treaty Act." As discussed above, apart from certain limited exceptions, the USFWS has not implemented an incidental take program for the MBTA.

Sections 3511, 4700, 5050, and 5515 of the CFGC prohibit the take or possession of certain birds, mammals, fish, and reptiles. These species are commonly referred to as "fully protected" under state law and state agencies are prohibited from permitting actions that would result in the incidental take of these species except under the auspices of an approved Natural Community Conservation Plan.

California Native Plant Protection Act of 1977; California Fish and Game Code §1900 et seq.

The Native Plant Protection Act of 1977 (CFGC 1900 et seq.) authorizes CDFW to designate rare and endangered native plants and provides specific protection measures for state listed species.

CEQA Guidelines Section 15380

CEQA Guidelines Section 15380(b) provides that 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 be "endangered" or "rare" within the meaning of the statute. To be "endangered" means that the species survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors. A species is "rare" when either: (1) although not presently threatened with extinction, the species exists in such small numbers throughout all or a significant portion of its range that it may become endangered if the environment worsens or (2) the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and not be considered "threatened" within the meaning of the ESA.

Natural Community Conservation Planning Act (Fish and Game Code 2800 et seq.)

In 1991 California enacted the Natural Community Conservation Planning Act (CFGC Section 2800 et seq.) to authorize the creation and implementation of natural community conservation plans (NCCPs) to conserve natural communities at the ecosystem level while accommodating compatible land use. The act was revised in 2003 and has been subsequently amended. An NCCP is intended to function much like a federal HCP and provide for the long-term conservation of wildlife and plant communities in regional locations in manner that also allows for economic development and growth. Section 2805(e) allows the incidental take of fully protected species that are covered under an approved NCCP.

Regional and Local

Kern County General Plan

The project area is located within the Kern County General Plan (KCGP) area and, therefore, would be subject to applicable policies and measures of the KCGP. The Land Use, Conservation, and Open Space Element, the Noise Element, and the Energy Element of the KCGP include goals, policies, and implementation measures related to biological resources that apply to the project, as described below.

Chapter 1. Land Use, Conservation, and Open Space Element

1.3. Physical and Environmental Constraints

Policies

Policy 9. Construction of structures that impede water flow in a primary floodplain will be discouraged.

Policy 11. Protect and maintain watershed integrity within Kern County.

Implementation Measures

Implementation Measure I. Designated flood channels and water courses, such as creeks, gullies, and riverbeds, will be preserved as resource management areas or in the case of urban areas, as linear parks whenever practical.

1.9. Resource

Policies

Policy 11. Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.

Policy 20. Areas along rivers and streams will be conserved where feasible to enhance drainage, flood control, recreational, and other beneficial uses while acknowledging existing land use patterns.

1.10. General Provisions

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 to fish, wildlife, and botanical resources.

Policy 29. The 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 31. Under the provisions of the California Environmental Quality Act (CEQA), the County, as lead agency, will solicit comments from the California Department of Fish and Game and the USFWS when an environmental document (Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report) is prepared.

Policy 32. Riparian areas will be managed in accordance with United States Army Corps of Engineers, and the California Department of Fish and Game rules and regulations to enhance the drainage, flood control, biological, recreational, and other beneficial uses while acknowledging existing land use patterns.

Implementation Measures

Implementation Measure Q. Discretionary projects shall consider effects to biological resources as required by the California Environmental Quality Act.

Implementation Measure R. Consult and consider the comments from responsible and trustee wildlife agencies when reviewing a discretionary project subject to the California Environmental Quality Act.

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

1.10.6. Surface Water and Groundwater

Policies

Policy 44. Discretionary projects shall analyze watershed impacts and mitigate for construction-related and urban pollutants, as well as alterations of flow patterns and introduction of impervious surfaces as required by the California Environmental Quality Act (CEQA), to prevent the degradation of the watershed to the extent practical.

1.10.7. Light and Glare

Policies

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.

Implementation Measures

Implementation Measure AA. The County shall utilize CEQA Guidelines and the provisions of the Zoning Ordinance to minimize the impacts of light and glare on adjacent properties and in rural undeveloped areas.

Implementation Measure KK. The following applies to discretionary development projects (General Plan Amendment, zone change, conditional use permit, tract maps, parcel maps, precise development plan) that contains oak woodlands, which are defined as development parcels having canopy cover by oak trees of at least ten percent (10%), as determined from base line aerial photography or by site survey performed by a licensed or certified arborist or botanist. If this study is used in an Environmental Impact Report, then a Registered Professional Forester (RPF) shall perform the necessary analysis.

a. Development parcels containing oak woodlands are subject to a minimum canopy coverage retention standard of thirty percent (30%). The consultant shall include recommendations regarding thinning and diseased tree removal in conjunction with the discretionary project.
b. Use of aerial photography and a dot grid system shall be considered adequate in determining the required canopy coverage standard.
c. Adjustments below thirty percent (30%) minimum canopy standard may be made based on a report to assess the management of oak woodlands.
d. Discretionary development, within areas designated as meeting the minimum canopy standard, shall avoid the area beneath and within the trees unaltered dripline unless approved by a licensed or certified arborist or botanist.

Implementation Measure LL. The following applies to development of parcels having oak tree canopy cover of less than ten percent (10%) but containing individual oak trees equal to or greater than a 12-inch diameter trunk at 4.5 feet breast height.

a. Such trees shall be identified on plot plans.

b. Discretionary development shall avoid the area beneath and within the trees unaltered drip line unless approved by a licensed or certified arborist or botanist.

c. Specified tree removal related to the discretionary action may be granted by the decision-making body upon showing that a hardship exists based on substantial evidence in the record.

Chapter 3. Noise Element

3.2. Noise Sensitive Areas

Policies

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.

Kern County Zoning Ordinance (Title 19 of the Ordinance Code of Kern County)

Chapter 19.98 Oil and Gas Production

The purpose of this chapter is to promote the economic recovery of oil, gas, and other hydrocarbon substances in a manner compatible with surrounding land uses and protection of the public health and safety by establishing reasonable limitations, safeguards, and controls on exploration, drilling, and production of hydrocarbon resources. The procedures and standards contained in this chapter shall apply to all exploration drilling and production activities related to oil, gas, and other hydrocarbon substances carried out in unincorporated Kern County.

Section 19.98.050(I): Whenever oil or gas is produced into and shipped from tanks located on the premises, such tanks, whenever located within five hundred (500) feet of any dwelling or commercial building, shall be surrounded by shrubs or trees, planted and maintained so as to develop attractive landscaping or shall be fenced in such a manner as to, insofar as practicable, screen such tanks from public view. Such fencing shall comply with the requirements of the California Division of Oil and Gas.

Section 19.98.050(K): Pumping wells shall be operated by electric motors or muffled internal combustion engines.

Section 19.98.050(L): The height of all pumping units shall not exceed thirty-five (35) feet and shall be painted and kept in neat condition.

Section 19.98.050(N): After production begins and a pump is installed on the wellhead, a fence at least six (6) feet in height shall be installed around the pump site or drilling island for public safety. This fence shall be constructed of chain link with wood or metal slats, or other screening fence as may be approved by the Planning Director. This fencing and screening requirement shall apply only to those pump sites located within five hundred (500) feet of any dwelling. Such fencing shall comply with the requirements of the California Division of Oil and Gas.

Section 19.98.050(O): All required federal, State, and County rules and regulations shall be complied with at all times.

Habitat Conservation Plans, Natural Community Conservation Plans or other Approved Local, Regional, or State HCP in the Project Area

As previously noted, CRC has a CAMP that governs the Elk Hills Conservation Area. This area was established in fulfillment of the Biological Opinion issued by the USFWS in 1995. Within the project site, CCS facilities would be located within the Elk Hills CAMP. HCPs are approved by the USFWS in conjunction with providing ITP coverage for listed species and to also foster the conservation of other covered species. NCCPs are approved by the CDFW and are intended to function in a manner similar to the federal HCP for state listed and other covered species. The CDFW may also issue incidental take permits for state covered species that are based on and coordinated with an approved federal HCP under section 2081(b) of the CESA. HCPs and NCCPs typically have permits terms ranging from 30 to 50 years.

CRC Elk Hills Conservation Area Management Plan

CRC has obtained a Section 2081 incidental take permit (ITP), which extends the term and coverage of, and superseded, previous CESA Memorandum of Understanding (Fish and Game Code 2081.1), which authorized the take of CESA-listed species incidental to ongoing oil and gas and related activities. The ITP has a term of 50 years, and authorizes incidental take for the following categories of general activities: (1) the continued exploration, development, production, recovery and processing of oil and gas reserves on the 47,884-acres of Elk Hills over a period of 50 years, including the drilling of additional wells, which could result in the permanent disturbance of up to 4,000 acres and the temporary disturbance of up to 3,000 acres of presently undisturbed land; (2) the operation, maintenance and repair of facilities associated with existing facility ROWs (i.e.; product transmission lines and pipelines, waterlines, and powerlines, etc.) both on Elk Hills and within a surrounding 2-mile buffer (which encompasses 59,662 acres); (3) the installation, operation and maintenance of limited additional off-site facilities within the 2-mile buffer; and (4) implementation of the conservation program specified in the Section 2081(b) application, including the management for conservation purposes of Conservation Lands designated within Elk Hills and/or acquired in the adjacent 2-mile buffer area or areas otherwise approved by the CDFW and the USFWS.

Incidental Take Permit

CRC acquired an ITP from CDFW, pursuant to Section 2081(b) of the Fish and CFGC on October 3, 2012, (Appendix C-2). The HCP supports the conservation and management program for the

area covered by the Elk Hills ITP, which is approximately 47,884 acres; facility rights-of-way (ROWs) located outside of Elk Hills; and any Conservation Lands located within a Target Acquisition Area inside the 2-mile buffer and within a second Target Acquisition Area located outside the 2-mile buffer that are dedicated pursuant to Elk Hills and managed for the mitigation of impacts (the Elk Hills ITP Covered Lands). Because the Elk Hills ITP Covered Lands includes projected oil and gas operations for 50 years, the ITP has a term of 50 years and authorizes incidental take of certain State listed species during the course of otherwise lawful activities (Table 4.4-4).

Table 4.4-4: Elk Hills Habitat Conservation Plan Covered Species

Scientific Name	Common Name	Status	
		Federal	State
Wildlife			
Ammospermophilus nelsoni	San Joaquin antelope squirrel	-	CT
Dipodomys ingens	Giant kangaroo rat	FE	CE
Dipodomys nitratoides nitratoides	Tipton kangaroo rat	FE	CE
Vulpes macrotis mutica	San Joaquin kit fox	FE	CT
Plants			
Caulanthus californicus	California jewelflower	FE	CE
Eremalche kernensis	Kern mallow	FE	-
Monolopia congdonii	San Joaquin woolly-threads	FE	-

Federal
FE = Federal Endangered
-- = no federal status
State
CE = State Endangered
CT = State Threatened
-- = no state status

Implementation of a Conservation Program, including all activities associated with the implementation of the ITP, included in a Management Plan approved by CDFW. The Management Plan is property specific, and any necessary activities are developed and implemented based on existing conditions of each specific area. Such Management Plans are standard requirements of ITPs and must be developed and approved as part of the ITP conditions within a specified time period following issuance of an ITP. The purpose of the Management Plan is to ensure the Conservations Lands are managed, monitored and maintained in perpetuity. The Management Plan also assists in minimizing and fully mitigating the impacts of the authorized take. The Management Plan is a binding and enforceable instrument, implemented by the CDFW. The CDFW's approval of a Management Plan relies on meeting the fully mitigated standard.

A Land Manager was selected to manage and monitor the Conservation Lands in perpetuity to preserve its habitat and conservation values in accordance with the Conservation Easement and the Management Plan, which includes but is not limited to providing annual reports to the CDFW regarding management tasks, monitoring activities, and associated funds for the specific monitoring year. The Management Plan also documents the status of the Covered Species and other species of concern and describes the status of the Conservation Lands. Components of this Management Plan include, but are not limited to all activities associated with the implementation of the ITP, including take avoidance and minimization activities (including salvage of Covered Species within Covered Lands), establishment and management of preserved habitat areas, vegetation manipulation and enhancement, monitoring, maintenance of Conservation Lands infrastructure such as fences, gates, signs and access roads, habitat restoration, related vehicular access, and all activities associated with adaptive management and responses to changed or unforeseen circumstances.

Ongoing monitoring shall also be conducted to assess condition of fences, gates, and signage and to identify sources of illegal trash disposal. Fencing, gates, and signage will be repaired or replaced as necessary throughout the year. Trash will be collected and removed as identified to prevent attractive nuisances.

Revegetation opportunities for future habitat reclamation exist in areas of Elk Hills where land has been disturbed as a result of prior construction and development, travel, or any other action which caused plant cover destruction and the disturbed area is no longer required to support ongoing operations. Inactive well pads and tank setting locations, ROWs, and dirt roads can all offer opportunities for habitat reclamation. The habitat reclamation program at Elk Hills on smaller sites (less than 3 acres), therefore, consists of site cleanup, slope re-contouring and ripping of compacted sites/heavily disturbed sites followed by replacement of any salvaged topsoil and seed bank, scarifying the area to create seed traps and microhabitat, along with soil stabilization and erosion control measures. Dirt roads no longer needed to support ongoing operations can also offer opportunities for habitat reclamation by limiting road use, reducing compaction via ripping, and providing seed traps and microhabitats. With the use of monitoring practices, natural habitat reclamation or revegetation in disturbed areas has shown successful results to restore land to its natural state.

Project activities would take place completely within Elk Hills. If CRC elects in the future to pursue any disturbance outside of Elk Hills within the CAMP boundary, it would be required at that time to obtain all applicable regulatory approvals, including separate incidental take authorization.

The EPA UIC Class VI permit process is conducting a formal consultation with US Fish and Wildlife Service on the area of review for both permits.

Recovery Plans

Section 4 of the federal ESA requires, subject to certain exceptions, that the USFWS develop recovery plans for listed species. A recovery plan is not regulatory action and is intended to provide guidance for managing land and resources in a manner that fosters the recovery and continued

survival of threatened and endangered species. The following section discusses the single recovery plan that has been developed by the USFWS pertinent to the project area and adjacent lands.

Recovery Plan for Upland Species of the San Joaquin Valley, California (Williams et al. 1998)

In 1998, the USFWS published an ecosystem-oriented recovery plan for 11 threatened and endangered species (one, Hoover's woolley star, since delisted) and 23 other native plants and animals in the San Joaquin Valley, including the California jewelflower, palmate-bracted bird's-beak, Kern mallow, San Joaquin woolly-threads, Bakersfield cactus, Hoover's woolly-star, giant kangaroo rat, Fresno kangaroo rat, Tipton kangaroo rat, blunt-nosed leopard lizard, San Joaquin kit fox, lesser saltscale, Bakersfield smallscale, Lost Hills saltbush, Vaseks clarkia, Temblor buckwheat, Tejon poppy, diamond-petaled California poppy, Comanche Point lavia, Munz's tidy-tips, jared's peppergrass, Merced monardella, Merced phacelia, oil neststraw, San Joaquin dune beetle, Dovens dune weevil, San Joaquin antelope squirrel, short-nosed kangaroo rat, riparian woodrat, Tulare grasshopper mouse, Buena Vista Lake shrew, riparian brush rabbit, and San Joaquin Le Conte's thrasher.

The SJV Recovery Plan recommends the protection of land in large blocks to minimize edge effects, increase the likelihood that ecosystem functions will remain intact, and facilitate management. The plan also seeks to connect blocks of conservation lands to allow for movement of species between blocks. The plan focuses on the conservation of the San Joaquin kit fox because this species occurs in nearly all the natural communities used by plan plants and animals. As a result, kit fox conservation provides an "umbrella of protection" for these species, and the kit fox is treated as the plan "umbrella" species. The recovery plan also focuses on the giant kangaroo rat and, to a lesser extent, the Fresno, short-nosed, and Tipton kangaroo rats as "keystone" species because they provide important or essential components of the biological niche of other covered species.

The 1998 plan identified four locations as the highest priority for large block land conservation in Kern County: (1) Elk Hills and Buena Vista Valley; (2) the Kern Fan Element; (3) Western Kern County (including the Lokern area); and (4) the Pixley National Wildlife Refuge/Allensworth Natural Area along the Kings County border. Two other areas including land in Kern County were identified as lower priority locations: (1) the Kern National Wildlife Refuge Semitropic Ridge Natural Area; and (2) the Bitter Creek National Wildlife Refuge. Fifteen smaller areas were identified as potential specialty reserves in the County.

4.4.4 Impacts and Mitigation Measures

Methodology

The following impact analysis is based on existing and potential biological resources occurring within the project site and vicinity of the project identified through a literature review and database analysis. Biological resources evaluated included sensitive habitats, special status plant and animal species, and potential for wildlife movement corridors. All State and federal data sources used for

analysis focused on the California USGS 7.5-minute quadrangles East Elk Hills and West Elk Hills, in which the project is located, and the surrounding 10 quadrangles: Belridge, Lokern, Buttonwillow, Rio Bravo, Tupman, Mouth of Kern, Taft, Fellows, Panorama Hills, and Reward (Appendix C). The potential for special status species to occur on the project site is based on the results of database research, biological assessments, surveys conducted on the project site and vicinity, presence of suitable habitat, and the proximity of the project site to previously recorded occurrences in the State and federal data sources used for analysis.

Biological resource surveys of the project area were conducted from September 20 to December 15, 2022, October 2023, and April 2024. The surveys consisted of walking meandering pedestrian transects spaced 50 to 100 feet apart throughout the project area. One hundred percent survey coverage of the project area was achieved. No protocol surveys were conducted for this analysis.

Tasks completed during the survey included developing an inventory of plant and wildlife species observed, characterizing vegetation associations and habitat conditions, assessing the potential for federally and State listed special status plant and wildlife species to occur, assessing potential for bat usage habitat, and assessing the potential for migratory bird and raptor nesting within the project area. All locational data were recorded using Esri Collector for ArcGIS software installed on an iPad, and site conditions were documented with representative photographs.

The following section describes potential impacts related to biological resources that could occur as a result of the project, and proposed mitigation measures.

The CEQA Guidelines define *direct impacts* as those impacts that result from a project and occur at the same time and place. *Indirect impacts* are caused by a project but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the project. The potential impacts discussed in this analysis are those most likely to be associated with construction and operation of the project. Construction impacts would include both direct and indirect impacts to biological resources. While direct impacts associated with construction of the project are expected to occur only through the duration of construction activities, indirect construction impacts, such as the spread of non-native and invasive weeds, could potentially remain an ongoing source of disturbance. Operational impacts would also include both direct and indirect impacts to biological resources. Ongoing operations and maintenance impacts would occur during routine inspection and maintenance of the project facilities and would include such activities as routine inspections and emergency repairs. Operational impacts would remain an ongoing source of disturbance for many plants and wildlife species that occur within the facility perimeter and in adjacent habitat.

Project impacts are considered permanent if they would involve the conversion of land to a new use, such as with the construction of new roads, well pad foundations, or operation and maintenance facilities. Temporary project impacts are those effects that do not result in the permanent land use conversion. Temporary effects to vegetation communities or other ground disturbance activities restricted solely to the construction phase, such as grading roads and clearing vegetation within staging areas, are considered temporary, provided that native vegetation is not replaced with infrastructure or the area is not maintained free of vegetation, and that restoration is completed.

Construction and operation of the project could impact plants and wildlife in a variety of ways. Construction activities could result in both direct and indirect impacts to species. Direct impacts as a result of construction activities associated with the installation of well pads and associated facilities would include temporary disturbance and/or loss of native vegetation communities utilized as habitat for both common and special status wildlife and plants. Other impacts could include fugitive dust, lighting that may alter species behavior, and increased noise levels due to heavy equipment operations during construction. Increased interaction with humans, loss of burrows and dens during well pad preparation, trenching activities associated with flow/pipelines and steam lines, or entrapment during other activities associated with construction may cause increased harassment, injury and/or mortality of a species.

Direct impacts as a result of construction activities associated with the project could include:

- The permanent removal and/or temporary disturbance of native vegetation communities utilized as habitat for both common and special status wildlife and plants, fugitive dust, and increased noise levels due to heavy equipment operations occurring in these areas.
- Excessive dust from construction activities can decrease the vigor and productivity of vegetation communities through effects on light penetration, photosynthesis, respiration, transpiration, increased penetration of phytotoxic gaseous pollutants, and increased incidence of pests and diseases.
- Noise and vibration associated with project activities may affect behavior of wildlife in several ways. Excessive noise may affect species behavior by causing nest or burrow abandonment and interfering or altering normal behaviors.
- Lighting that may affect behavioral activities, physiology, population ecology, and ecosystems of both diurnal and nocturnal wildlife.
- Increased human activity in the project area could affect essential behavioral activities and physiology of wildlife. Increased human activity could alter species behavior causing them to abandon nests or den sites. Abandonment (even temporary) of active nests or dens increases the risk to eggs, nestlings, fledglings, and other dependent young. Flushing animals from nests, dens, and other refuges also increases their risk of injury or mortality from collisions with construction equipment and other vehicles, as well as predation.
- An increase in non-native and invasive species could potentially increase and remain an ongoing source of disturbance. Impacts could include the loss of habitat due to the establishment of non-native and invasive weeds.
- An increase in mortality, injury, or displacement of special status plants or wildlife, loss or degradation of native habitat, or interference with wildlife movement or migration may also occur.

Indirect impacts to habitat could include alterations to existing topographical and hydrological conditions, increased erosion and sediment transport, and the establishment of non-native and invasive weeds. Operational impacts include disturbance due to increased human presence, risk of injury or mortality from maintenance vehicles on access roads, and further opportunities for the

introduction and spread of non-native and invasive weeds. More specifically, indirect impacts as a result of construction activities associated with the project could include:

- The removal of vegetation can result in indirect effects to biological resources from the permanent loss of habitat. Loss or degradation of habitat including damage to shrubs and plants could alter access to a variety of essential resources, including shade and food sources.
- Indirect impacts to habitat could include alterations to existing topographical and hydrological conditions, increased erosion and sediment transport, and the establishment of non-native and invasive weeds.
- Indirect effects caused by disturbance-type impacts, such as construction activity near an active nest or primary foraging area, also have the potential to impact raptor species.
- Indirect impacts attributed to the colonization of non-native weeds could include a gradual decrease in natural biodiversity as non-native weed infestations may extirpate native plant populations.

Operational impacts could also include mortality, injury, or displacement of special status plants or wildlife; loss or degradation of native habitat; interference with wildlife movement or migration; disturbance to plants, animals and habitat from noise, light, or dust; and disturbance due to increased human presence; risk of injury or mortality from maintenance vehicles on access roads; and further opportunities for the introduction and spread of non-native and invasive weeds.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist state that a project would normally be considered to have a significant impact if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP.

Project Impacts

Impact 4.4-1: 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 Wildlife or United States Fish and Wildlife Service

The proposed project would require ground disturbance during construction of the project including approximately 330,000 square feet of area to be graded at approximately 6 inches in depth.

As discussed below, the County would require mandatory minimum mitigation for any new land disturbance associated with CCS activities in the project area.

New land disturbance in locations occupied by special status plants and wildlife could result in both direct and indirect impacts to such species. New land disturbance outside of actively disturbed areas could reduce the amount of available habitat for one or more special status species within the project area. Degradation of habitat including damage to shrubs and plants could alter access to a variety of essential resources, including shade and food sources. In addition, construction activities could result in the displacement and/or potential mortality of resident wildlife species that are poor dispersers such as snakes, lizards, and small mammals. Direct impacts as a result of construction activities associated with the project could include the permanent removal and temporary disturbance of native vegetation communities utilized as habitat for both common and special-status wildlife and plants, fugitive dust, and increased noise levels due to heavy equipment operations occurring in these areas.

Indirect construction impacts to habitat could include alterations to existing topographical and hydrological conditions, increased erosion and sediment transport, and the establishment of non-native and invasive weeds. Injection well operations could also indirectly affect special status plants and wildlife by generating dust, emissions, noise, light, and unintentional spills or discharges; introducing invasive species; or increasing the risk of unauthorized vehicular use or other human activity that disturb occupied or suitable species status species habitats.

Special-Status Plants

Presence of special-status plant species are discussed in Section 4.4.2 and are summarized below:

- Heartscale was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of Valley saltbush scrub habitat.
- Lost Hills crownscale was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of saltbush scrub habitat within the project area.
- California jewelflower was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of saltbush scrub habitat within the project area.
- Recurved larkspur was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of saltbush scrub habitat within the project area.
- Kern Mallow was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of saltbush scrub habitat within the project area.
- Temblor buckwheat was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of saltbush scrub habitat intermixed with annual grassland within the project area.
- Tejon poppy was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of saltbush scrub habitat intermixed with annual grassland within the project area.
- Showy golden madia was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of saltbush scrub habitat intermixed with annual grassland within the project area.
- San Joaquin woolly-threads was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of saltbush scrub habitat within the project area.
- Oil nestraw was not observed within the project area during the surveys. However, the project area is within the known range for the species and the species could potentially be present within the fragments of saltbush scrub habitat within the project area.

Direct impacts from construction activities could include the destruction or injury of individual plants if present. During the growth and blooming period, the spread of dust during construction could cause an indirect impact on the species, as could the spread of non-native or invasive species

caused by project activities. Competition with invasive plants would have an indirect impact on this species.

Mitigation Measures (MM) 4.4-1 through MM 4.4-3, MM 4.4-5, MM 4.4-10, MM 4.4-11, and MM 4.4-13 have been identified to reduce construction impacts to special status plant species to less than significant. No impacts to special-status plant species are anticipated to occur during operational phase of the project.

Special-Status Wildlife

Presence of special-status wildlife species are discussed in Section 4.4.2 and are summarized below:

Crotch's Bumble Bee

Crotch's bumblebee was not observed during reconnaissance surveys. Known host plants of the species (Chaenactis, Lupinus, Medicago, Phacelia, and Salvia) were also not observed, though the surveys were conducted outside of the optimal blooming period. There are only six Calflora records of potential host plant occurrences within the project area, ranging from between 1937 and 1992. However, the project area is within the known range for the species, and suitable habitat is present. Direct impacts to Crotch's bumblebee could include mortality or injury caused by project construction activities. The project could also result in loss of suitable habitat. Implementation of MM 4.4-1, MM 4.4-11, MM 4.4-13, and MM 4.4-15 would reduce impacts to the species.

California Glossy Snake

The San Joaquin coachwhip was not observed during reconnaissance surveys. However, the project area is within the known range for the species and suitable habitat is present. This species is nocturnal, so impacts of construction activities are expected to be limited. Direct impacts to California glossy snake could include mortality or injury caused by project construction activities. Noise, vibration, and increased human activity could alter the normal behaviors of the lizard. The project could also result in the loss of suitable habitat. Implementation of MM 4.4-1, MM 4.4-3, and MM 4.4-11 would reduce impacts to the species.

Blunt-nosed Leopard Lizard

The blunt-nosed leopard lizard was not observed during reconnaissance surveys. However, the project area is within the known range for the species, suitable habitat is present, and there is a recent CNDDB record of the species within one mile of the project area.

Direct impacts to individuals could occur within the project area during construction activities that create noise, vibration, human activity, and dust. These impacts could result in behavior modification, direct mortality or injury from vehicle strikes, or entombment of collapsed burrows. The project area is located predominantly along established pipeline routes within an active oilfield, so exposure from these stressors during construction would be only slightly greater than traffic and construction activity that already occurs in the vicinity. The intensity of the exposure to these specific impacts within the project area is anticipated to be low because no blunt-nosed leopard

lizards were observed within the project area. The intensity of the exposure to stressors would diminish with distance, with the effects of stressors becoming negligible at a distance of 250 feet.

Indirect impacts caused by noise, vibration, and the presence of construction workers could alter the normal behaviors of lizards and affect reproductive success, affect foraging success, or result in displacement from active burrows. Loss of suitable habitat could cause indirect impacts on the species, but impacts would be minimal given the poor quality of the habitat present. The intensity of the exposure to stressors would diminish with distance, with the effects of stressors becoming negligible at a distance of 250 feet.

Without appropriate avoidance and minimization measures for this species, potentially significant impacts associated with ground-disturbing activities include habitat loss, burrow collapse, reduced reproductive success, or direct mortality. If there is an active burrow within land adjacent to the project site or proposed alternative routes, noise and vibration from construction activities could alter the daily behaviors of individuals and affect foraging activity and reproductive success during the short-term construction period. Habitat loss could result in indirect impacts through increased competition for limited resources over the long-term. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-9, MM 4.4-11, and MM 4.4-13 listed below would avoid direct impacts to the species.

San Joaquin Coachwhip

The San Joaquin coachwhip was not observed during reconnaissance surveys. However, the project area is within the known range for the species, suitable habitat is present, and there is a recent CNDDB record of the species within one mile of the project area. Direct impacts to the San Joaquin coachwhip could include mortality or injury caused by project construction activities. Noise, vibration, and increased human activity could alter the normal behaviors of the lizard. The project could also result in the loss of suitable habitat. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-11, and MM 4.4-13 would reduce impacts to the species.

Coast Horned Lizard

The Coast horned lizard was not observed during reconnaissance surveys. However, the project area is within the known range for the species and suitable habitat is present. Direct impacts to the coast horned lizard could include mortality or injury caused by project construction activities. Noise, vibration, and increased human activity could alter the normal behaviors of the lizard. The project could also result in loss of suitable habitat. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-11, and MM 4.4-13 would reduce impacts to the species.

Temblor Legless Lizard

The Temblor legless lizard was not observed during reconnaissance surveys. However, the project area is within the known range for the species and suitable habitat is present. Direct impacts to the temblor legless lizard could include mortality or injury caused by project construction activities. Noise, vibration, and increased human activity could alter the normal behaviors of the lizard. The project could also result in loss of suitable habitat. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-11, MM 4.4-13, and MM 4.4-14 would reduce impacts to the species.

Burrowing Owl

Burrowing owl was not directly observed during reconnaissance surveys. However, burrows displaying diagnostic sign of the species (white-wash, pellets, feathers) were observed within the project area, the project area is within the known range for the species, and suitable habitat is present. Direct and/or indirect impacts to burrowing owl could occur if there is an active burrow within the project area during the period of construction activities. Construction activities could result in crushing or destroying a burrow, with or without a burrowing owl inside. Noise, vibration, and increased human activity resulting from project construction activities could alter the daily behaviors of individual owls and affect foraging success, displace owls from their burrows, or lead to nest failure. Operational activities have the potential to impact burrowing owls in the same way but to a lesser degree than construction activities. Suitable nesting and foraging habitat would be lost as a result of the project. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-4, MM 4.4-11, and MM 4.4-13 would reduce impacts to the species.

Swainson's Hawk

Swainson's hawk was not observed during reconnaissance surveys. However, the project area is within the known range for the species and suitable habitat for foraging is present. Direct impacts to Swainson's hawks could occur if construction activities occur near an active nest or in foraging habitat during the nesting season. Complete tree removal, noise, and vibration from construction of the project, plus the presence of construction workers, could alter the normal behaviors of nesting adults, resulting in harm or death to eggs or nestlings. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-8, MM 4.4-11, and MM 4.4-13 would reduce impacts to the species.

Prairie Falcon

Prairie falcon was not observed during reconnaissance surveys. However, the project area is within the known range for the species and suitable habitat for foraging is present. Direct impacts to the prairie falcon could include mortality or injury caused by project construction activities. Noise, vibration, and increased human activity could alter normal behaviors resulting in reduced foraging success and displacing individuals from established territories. Loss of suitable habitat could impact the species. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-8, MM 4.4-11, and MM 4.4-13 would reduce impacts to the species.

Loggerhead Shrike

There were no observations of loggerhead shrike during reconnaissance surveys. Open areas of scrub habitat within the project area provide suitable nesting and foraging habitat for loggerhead shrike. The species may use fence posts, utility lines, or scrubs within the project area as perches and nest in areas of dense foliage. Direct impacts to this species could include the destruction of active nests resulting from project construction activities. Noise, vibration, and increased human activity could alter normal behaviors resulting in nest failure, reducing foraging success, and displacing individuals from established territories. Loss of suitable habitat could impact the species. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-8, MM 4.4-11, and MM 4.4-13 would reduce impacts to the species.

Le Conte's Thrasher

There were no observations of Le Conte's thrasher during reconnaissance surveys. The project area provides suitable nesting and foraging habitat. The species may forage in areas of saltbush habitat and use saltbushes as nesting sites. Direct impacts to this species could include the destruction of active nests resulting from project construction activities. Noise, vibration, and increased human activity could alter normal behaviors resulting in nest failure, reducing foraging success, and displacing individuals from established territories. Loss of suitable habitat could impact the species. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-8, MM 4.4-11, and MM 4.4-13 would reduce impacts to the species.

San Joaquin Antelope Squirrel

Multiple San Joaquin antelope squirrel observations were made throughout the project area during reconnaissance surveys (Appendix C-1). Suitable habitat for this species containing suitable burrows is present within the project area. Direct impacts to this species could include mortality or injury caused by entrapment or crushing individuals within burrows or from vehicle strikes during construction. Indirect impacts caused by noise, vibration, and the presence of construction workers could alter the normal behaviors of San Joaquin antelope squirrel, which could affect reproductive success, foraging success, or displacement from active burrows. Loss of foraging habitat could impact the species. Loss of suitable habitat could cause indirect impacts on the species, but impacts would be minimal given the amount of suitable foraging habitat throughout the region. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-8, MM 4.4-11, and MM 4.4-13 would reduce impacts to the species.

Giant Kangaroo Rat

Giant kangaroo rat was not observed during reconnaissance surveys. However, the project area is within the known range of the species, suitable habitat is present. Direct impacts to this species could include mortality or injury caused by entrapment or crushing individuals within burrows or from vehicle strikes during construction. Indirect impacts caused by noise, vibration, and the presence of construction workers could alter the normal behaviors of giant kangaroo rat, which could affect reproductive success, foraging success, or displacement from active burrows. Loss of foraging habitat could impact the species. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-11, and MM 4.4-13, listed below, would reduce impacts to the species.

Short-nosed Kangaroo Rat

The short-nosed kangaroo rat was not observed during reconnaissance surveys. However, the project area is within the known range of the species, suitable habitat is present, and potentially suitable burrows fitting the size characteristics of kangaroo rats and displaying sign consistent with use by the species (tail-drags) were observed. Direct impacts to this species could include mortality or injury caused by entrapment or crushing individuals within burrows or from vehicle strikes during construction. Indirect impacts caused by noise, vibration, and the presence of construction workers could alter the normal behaviors of short-nosed kangaroo rat, which could affect reproductive success, foraging success, or displacement from active burrows. Loss of foraging

habitat could impact the species. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-11, and MM 4.4-13, listed below, would reduce impacts to the species.

Tulare Grasshopper Mouse

The Tulare grasshopper mouse was not observed during reconnaissance surveys. However, the project area is within the known range of the species, suitable habitat is present, and potentially suitable burrows fitting the size characteristics of the species were observed. Direct impacts to this species could include mortality or injury caused by entrapment or crushing individuals within burrows or from vehicle strikes during construction. Indirect impacts caused by noise, vibration, and the presence of construction workers could alter the normal behaviors of Tulare grasshopper mouse, which could affect reproductive success, foraging success, or displacement from active burrows. Loss of foraging habitat could impact the species. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-11, and MM 4.4-13, listed below, would reduce impacts to the species.

San Joaquin Pocket Mouse

The San Joaquin pocket mouse was not observed during reconnaissance surveys. However, the project area is within the known range of the species, suitable habitat is present, and potentially suitable burrows fitting the size characteristics of the species were observed. Direct impacts to this species could include mortality or injury caused by entrapment or crushing individuals within burrows or from vehicle strikes during construction. Indirect impacts caused by noise, vibration, and the presence of construction workers could alter the normal behaviors of San Joaquin pocket mouse, which could affect reproductive success, foraging success, or displacement from active burrows. Loss of foraging habitat could impact the species. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-11, and MM 4.4-13 would reduce impacts to this species.

American Badger

The American badger was not observed during reconnaissance surveys. However, suitable denning and foraging habitat is present within the project area, and potentially suitable dens and sign of badger were observed during surveys. Direct impacts to this species could include mortality or injury caused by entrapment or crushing individuals within dens and vehicle strikes. Indirect impacts to the species could be caused by noise, vibration, and the presence of construction workers that could alter normal behaviors, which could affect reproductive success, foraging success, or displacement from active dens if they were present within or adjacent to the project area during construction. Operational activities could impact the species in many of these same ways because it is assumed that this species could be present from time to time during the operational phase of the project. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-11, and MM 4.4-13 would reduce impacts to this species.

San Joaquin Kit Fox

No San Joaquin kit fox were observed during reconnaissance surveys. However, potentially suitable dens, some including diagnostic sign such as scat and track, were observed throughout the project area. San Joaquin kit fox den in a variety of areas, such as ROWs and vacant lands, and they may be attracted to the project area because of the type and level of ground-disturbing activities

and the loose, friable soils resulting from intensive ground disturbance. Since this species is highly mobile, foxes could be injured or killed if they disperse through the project area during construction or operations activities. Direct impacts could also include entrapment in trenches or pipes during construction. If there is an active den within the project footprint during construction activities, noise and vibration from construction activities could alter the daily behaviors of individuals and affect foraging activity, or dens could be subject to collapse. Mortalities from vehicle strikes are possible but the proposed project would not cause an appreciable increase in traffic at night when the species is most active. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-6, MM 4.4-11, and MM 4.4-13, listed below, would avoid direct impacts to the species.

Nesting Birds

The entire project area contains habitat suitable to support a wide variety of nesting native and non-native bird species. Depending on the timing of construction, eggs, and nestlings of bird species with small, well-hidden nests could be subject to loss. This action would result primarily during habitat clearing, earth removal, grading, digging, and equipment movement. If nesting occurs on the project area during construction, an Environmentally Sensitive Area may be established to reduce or eliminate potential impacts to nesting birds, eggs, and nestlings. Noise, vibration, and increased human activity resulting from project construction activities could alter the daily behaviors of individuals and affect foraging success or lead to nest failure. Access roads will be utilized during the construction phase, and there exists a potential for mortality due to vehicle collisions, although this risk is minimal as highly mobile species like birds are expected to disperse to nearby habitat. Implementation of MM 4.4-1, MM 4.4-3, MM 4.4-8, MM 4.4-11, and MM 4.4-13 would reduce impacts to nesting birds.

Mitigation Measures

Avoidance and minimization measures are designed to reduce or eliminate impacts to special-status species through project construction, operation, and decommissioning. Detailed specific measures are outlined below for each special-status species that may occur on the project site.

MM 4.4-1 The following are requirements for all grading and construction activities on all project components in the defined disturbance area, including all injection wells, abandonment of wells, capture facilities and pipelines. The remaining CCS Surface Land Area that is within the project boundary but has no construction or disturbance is not subject to this requirement.

A. Qualifications: The Owner/operator shall use a qualified biologist for all work on reports submitted for any application for project permit. The qualified biologist must have a Bachelor of Science Degree or Bachelor of Arts Degree in biology or related environmental science, have demonstrated familiarity with the natural history, habitat affinities and identification of Covered Species of the San Joaquin Valley and have conducted work in California for at least one (1) year of field level reconnaissance survey work in the San Joaquin Valley. The resume of the biologist preparing any report submitted for permits shall be included in

the report. Lack of these specific qualifications will result in immediate rejection of the report without further review.

B. Protocol Surveys: Based on the information gathered from the biological reconnaissance survey and any informal consultation with United States Fish and Wildlife Service and California Department of Fish and Wildlife, any required focused/protocol surveys shall be conducted by a qualified biologist consistent with protocol study timelines in advance of submittal of the permit application to determine the presence/absence of sensitive species protected by state and federal Endangered Species Acts and potential project impacts to those species.

The survey shall be conducted in accordance with the most current standard protocol of the United States Fish and Wildlife Service and California Department of Fish and Wildlife. The purpose of focused/protocol surveys is to confirm the presence or absence of any species listed as threatened or endangered under the federal Endangered Species Act. Threatened or endangered under the California Endangered Species Act, rare or endangered in the California Native Plant Protection Act or designated as fully protected in the California Fish and Game Code (collectively, "Protected Species"), and to confirm the presence or absence of any other species considered "sensitive" under California Environmental Quality Act ("Sensitive Species"), and to identify and implement avoidance and minimization measures for such species. The surveys shall be conducted in accordance with all currently applicable presence and absence survey and/or species protocols established by the United States Fish and Wildlife Service and the California Department of Fish and Wildlife ("Species Protocols"). In the absence of any approved protocols, the survey shall extend for a minimum of 250 feet from all areas where any ground disturbance activities would occur, provided that permission to access has been obtained.

As an alternative to individual pre-disturbance surveys for each application, and after consultation with and concurrence by the California Department of Fish and Wildlife and the United States Fish and Wildlife Service, multiple parcels or areas of CCS activities (including lands which may have multiple surface or mineral ownership) may be consolidated for the purpose of more efficiently managing pre-disturbance surveys and determinations regarding the absence of protected species in areas of proposed new ground disturbance activities.

C. Monitoring: A biological monitor with the same qualifications as a qualified biologist shall be present during ground-disturbing activities in project locations that have special-status species habitat or are adjacent to potential special-status species habitat. Within 30 days before any ground-disturbing activities in special-status species habitat, the qualified biologist shall conduct a pre-disturbance survey to record existing

conditions of the site, determine if conditions have changed since the reconnaissance or focused/protocol surveys were conducted, and to determine where sensitive species avoidance buffers will be established.

MM 4.4-2 **Take Authorization**: No incidental take of any species listed as threatened or endangered under the federal Endangered Species Act, threatened or endangered under the California Endangered Species Act, rare or endangered in the California Native Plant Protection Act, or designated as fully-protected in the California Fish and Game Code (Protected Species) may occur unless the incidental take is authorized by applicable state and federal wildlife agencies in the **form of a permit or other written authorization**, an approved state or federal conservation plan, or in accordance with an approved regional plan such as the Draft Valley Floor Habitat Conservation Plan and/or Natural Community Conservation Plan.

MM 4.4-3 **Buffers:** Protective buffers shall be used, where effective in the opinion of the qualified biologist, to avoid any unauthorized incidental take of Protected Species, and to minimize any incidental take of Sensitive Species, by separating the planned disturbance area from any locations where the qualified biologist has detected the presence of Protected Species or Sensitive Species. Protective buffers, as shown in Table 4.4-5, shall be delineated using brightly colored stakes and/or flagging or similar materials and remain until construction activities are complete, at which time of completion the buffers must be removed. Protective buffers shall be established around active dens and/or burrows of special-status animal species, or populations of special-status plant species to avoid unauthorized take of protected species as listed in Table 4.4-5. The protective buffer distance shall be increased if required to avoid unauthorized incidental take of any Protected Species as determined by a qualified biologist. Protective buffer distances and other avoidance measures that may be implemented to avoid impacts to Protected Species or Sensitive Species must be consistent with the United States Fish and Wildlife Service and/or the California Department of Fish and Wildlife and shall be implemented and overseen by the qualified biologist.

Table 4.4-5: Disturbance Buffers for Sensitive Resources

Sensitive Resource	Buffer Zone from Disturbance (feet)
Potential San Joaquin kit fox den	50
Known San Joaquin kit fox den	100
Natal San Joaquin kit fox den	500
Atypical San Joaquin kit fox den	50
Rodent burrows, small mammal burrows	50
Listed bird species active nests	0.5 miles

Table 4.4-5: Disturbance Buffers for Sensitive Resources

Sensitive Resource	Buffer Zone from Disturbance (feet)
Burrowing owl burrow (breeding and non-breeding season)	Pursuant to California Department of Fish and Wildlife guideline
San Joaquin coachwhip, all legless lizards, coast horned lizard	30
American badger: Non-maternity dens Maternity dens	 50 200
Crotch's bumble bee	50
Special-status plants	50

MM 4.4-4 Occupied burrowing owl burrows shall not be disturbed during the species nesting season (February 1 through August 31). The following distances shall be maintained between all disturbance areas and burrowing owl nesting sites (Table 4.4-6).

Table 4.4-6: Setback Distances for Burrowing Owl Nesting Sites by Level of Proposed Project Impacts

Location		
Nesting sites	Nesting sites	Nesting sites
Time of Year		
April 1–Aug 15	**Aug 16–Oct 15**	**Oct 16–Mar 31**
Project Impact Level		
Low		
656 feet (200 meters)	656 feet (200 meters)	164 feet (50 meters)
Medium		
1,640 feet (500 meters)	656 feet (200 meters)	328 feet (100 meters)
High		
1,640 feet (500 meters)	1,640 feet (500 meters)	1,640 feet (500 meters)

Burrowing owls present in proposed disturbance areas or within 500 feet or as specified under an approved Habitat Conservation Plan (as identified during pre-disturbance surveys) outside of the breeding season (between September 1 and January 31) may be moved away from the disturbance area using passive relocation techniques approved by the California Department of Fish and Wildlife. Passive relocation techniques in the California Department of Fish and Wildlife Staff Report on Burrowing Owl Mitigation Guidelines (CDFG 2012) include installing one-way doors in burrow entrances for 48 hours, to ensure the owl(s)

have left the burrow, daily monitoring during the passive relocation period, and collapsing existing burrows to prevent reoccupation. A minimum of one or more weeks will be required to relocate the owl(s) and allow for acclimatization to alternate off-site burrows. Prior to burrow exclusion or eviction, a burrowing owl management plan shall be prepared and approved by the California Department of Fish and Wildlife. Destruction of burrows shall occur only pursuant to a management plan for the species approved by the California Department of Fish and Wildlife; burrow excavation shall be conducted by hand whenever possible.

As an alternative to passive relocation, occupied burrows identified off site within 500 feet of construction activities may be buffered with hay bales, fencing (e.g., sheltering in place), or as directed by the qualified biologist and the California Department of Fish and Wildlife, to avoid disturbance of burrows.

MM 4.4-5 The following are requirements for any and all grading and construction activities on all project components, including all injection wells, abandonment of wells, capture facilities and pipelines:

a. The qualified biologist surveys shall determine whether active bat maternity roosts are located in or within 250 feet of any disturbance area. All active bat maternity roosts shall be avoided during breeding periods, including postponing disturbance activities. If an active Sensitive or Protected Species bat maternity roost location is proposed to be disturbed, the qualified biologist shall consult with, the United States Fish and Wildlife Service and California Department of Fish and Wildlife to identify any additional minimalization measures which the qualified biologist determines with the wildlife agencies can actually be implemented based on field conditions. All such measures must be implemented for project activities.

b. The qualified biologist surveys shall determine if there is any plants that would be disturbed that provide habitat for Crotch's Bumblebee. If such habitat is determined that appropriate surveys shall be required after consultation with California Department of Fish and Wildlife

MM 4.4-6 Any potential San Joaquin kit fox dens (as defined in United States Fish and Wildlife Service 2011) detected during reconnaissance or focused/protocol surveys shall be reevaluated by the qualified biologist for species activity no more than 30 days prior to the commencement of ground disturbance in the required pre-construction survey. Potential kit fox dens shall be marked, and a 50-foot avoidance buffer shall be delineated using brightly colored stakes and flagging or similar materials to prevent inadvertent damage to the potential den. If the qualified biologist determines that an unoccupied potential den cannot be avoided, the den may be hand excavated in accordance with the United States Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San

Joaquin Kit Fox Prior to or During Ground Disturbance (United States Fish and Wildlife Service 2011). If species activity is detected, the location shall be identified as a "known" kit fox den in accordance with the U.S. Fish and Wildlife Service species guidelines (United States Fish and Wildlife Service 2011). A minimum 100-foot buffer from any disturbance area shall be maintained for known dens and a minimum 500-foot buffer from any disturbance area shall be maintained for natal dens. No excavation of a known or natal den shall occur without prior authorization from the United States Fish and Wildlife Service and the California Department of Fish and Wildlife. For activities occurring on land covered under an approved federal and/or State incidental take authorization, the requirements set forth in those documents shall be implemented. Other standard measures to protect San Joaquin kit fox, including capping pipes, covering trenches, adding exit ramps to excavated areas, shall be implemented in accordance with MM 4.4-15.

MM 4.4-7 Occupied American badger dens detected during pre-disturbance surveys shall be flagged and ground-disturbing activities avoided within 50 feet of the den. Maternity dens shall be avoided and a minimum 200-foot buffer from disturbance shall be maintained during pup-rearing season (February 15 through July 1). Maternity dens must be avoided to the maximum extent feasible in the opinion of the qualified biologist. If an active maternity den is proposed to be disturbed, the qualified biologist, shall consult with the California Department of Fish and Wildlife to identify any appropriate additional minimization measures which the qualified biologist determines, with the wildlife agencies, can actually be implemented based on field conditions. All such measures must be implemented for project activities.

MM 4.4-8 Pre-disturbance surveys for active bird nests must be conducted no more than 10 days prior to the commencement of disturbance. Surveys shall follow United States Fish and Wildlife and California Department of Fish and Wildlife guidance and/or protocols, as applicable. If no active nests or nesting birds are identified, then project construction activities may proceed and no further mitigation measures for nesting birds are required. If active nest(s) are identified, the active nest(s) should be continuously surveyed for the first 24 hours after detection, to establish a behavioral baseline prior to any construction-related activities.

Once construction commences, all nests shall be continuously monitored to detect any behavioral changes as a result of the project (i.e., nest avoidance or abandonment). If behavioral changes are observed, the work causing that change shall cease until the Owner/operator qualified biologist consults with the California Department of Fish and Wildlife and the United States Fish and Wildlife and the qualified biologist used by the Owner/operator implements the recommended measures. During such times as the qualified biological monitor is not on site while construction workers are on site, a minimum non-disturbance buffer of 250 feet shall be established around active nests and a 500-foot no-disturbance buffer around the nests of raptors 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, and any adult birds are no longer occupying the nest. Deviations from these no disturbance buffers may be implemented if the qualified biologist concludes that work within the buffer area would not cause nest avoidance or abandonment (e.g., when the disturbance area would be concealed from a nest site by topography) provided that notification of this determination of a deviation in the no-disturbance buffer is provided by the qualified biologist no less than 15 days in advance to the California Department of Fish and Wildlife and the United States Fish and Wildlife.

MM 4.4-9 The following measures will be implemented to avoid take of blunt-nosed leopard lizard and to ensure protection of these animals during project activities:

a. Project activities will avoid all potential burrows that may be occupied by blunt-nosed leopard lizards. Suitable burrows within and adjacent to potential habitat for the species should be avoided by a minimum distance of 50-feet in all areas where ground-disturbing project activities will occur.

b. No more than one year prior to ground disturbing activities, focused surveys following current California Department of Fish and Wildlife and United States Fish and Wildlife protocols for detection of this species or other methods approved by both agencies shall be conducted in all potential blunt-nosed leopard lizard habitat within the work site and a 250-foot buffer area. If no individual blunt-nosed leopard lizards are observed during focused surveys, and surveys are current (e.g., completed in the same calendar year), then project activities may proceed.

c. If blunt-nosed leopard lizards are detected during focused surveys, a blunt-nosed leopard lizard avoidance plan shall be prepared for the project that will result in avoidance of incidental take of this species unless take is separately authorized under a Natural Communities Conservation Plan and appropriate federal authorization is obtained. At a minimum, the blunt-nosed leopard lizard avoidance plan shall be provided to the California Department of Fish and Wildlife and the County, and shall contain the following elements:

    1. A Worker Environmental Awareness Program shall be implemented for all construction personnel before construction begins.

    2. During periods that are optimal for blunt-nosed leopard lizard activity (early spring through late fall), a qualified biologist will be present during all ground disturbing activities. The qualified biologist will check the project site(s) and access route(s) daily during the blunt-nosed leopard lizard active season to determine presence or absence of lizards in or near the work areas.

Monitoring by a qualified biologist is not required during periods of inactivity (the winter season).

3. All open trenches or excavations shall be covered at the end of each workday or protected with the use of exclusion fencing to prevent wildlife entrapment. If an excavation is too large to cover, escape ramps shall be installed at an incline ratio of no greater than 2:1. All trenches and pipes shall be inspected for the presence of wildlife each day prior to the commencement of work. If blunt-nosed leopard lizards are observed at the work site during construction, construction shall cease within a 250-foot radius and the United States Fish and Wildlife Service and the California Department of Fish and Wildlife shall be consulted to determine what additional measures would be necessary to prevent take of this species.
4. Off-site locations where blunt-nosed leopard lizards have been observed or are likely to occur shall be clearly marked to prevent workers from driving off the road and to prevent inadvertent destruction of burrows. Barriers, such as exclusionary fencing may be installed. All construction equipment and construction personnel vehicles will be checked prior to moving to ensure no blunt-nosed leopard lizard are under equipment/vehicles.
5. A speed limit of 10 miles per hour shall be posted and observed within 0.25 miles of any reported blunt-nosed leopard lizard observation.
6. Construction activities shall avoid burrows that may be used by blunt-nosed leopard lizards. Any location of proposed construction activity with potential to collapse or block burrows (i.e., stockpile storage, parking areas, staging areas, trenches) will be identified prior to construction in the blunt-nosed leopard lizard avoidance plan and approved by the qualified biologist. The qualified biologist may allow certain activities in burrow areas if the combination of soil hardness and activity impact is not expected to collapse burrows and no blunt-nosed leopard lizards have been found during pre-project surveys in the impact area.
7. All individual blunt-nosed leopard lizards observed above-ground will be avoided. Any individual blunt-nosed leopard lizard that may enter the project site(s) would be allowed to leave unobstructed, and on its own accord. If a blunt-nosed leopard lizard is detected during biological monitoring or observed at any other point, the California Department of Fish and Wildlife and the United States Fish and Wildlife Service shall be notified to

determine what additional measures would be necessary to prevent take of the species.

MM 4.4-10 The Owner/operator shall comply with the following for any and all grading and construction activities on all project components, including all injection wells, abandonment of wells, capture facilities and pipelines.

a. Prior to ground disturbance plant surveys for Protected Species and Sensitive Species must be completed by a qualified biologist during the appropriate blooming periods for species identification and detection (as shown in Table 4.4.-7). Plant surveys shall be conducted in accordance with all applicable protocols established by the United States Fish and Wildlife Service and the California Department of Fish and Wildlife for particular plant species ("Plant Survey Protocol") and shall extend 50 feet from areas where any new disturbance would occur unless a greater survey distance is specified in the Plant Survey Protocol.

Table 4.4-7: Blooming Period of Special-Status Plants with Potential to Occur

Special-Status Plant Species	Optimal Blooming Period
Heart scale *(Atriplex cordulata var. cordulata)*	April – October
Lost Hills crownscale *(Atriplex coronata S. Watson var. vallicola)*	April – September
California jewelflower *(Caulanthus californicus)*	February – May
Recurved larkspur *(Delphinium recurvatum)*	March – June
Kern mallow *(Eremalche kernensis)*	February/March – May
Temblor buckwheat *(Eriogonum temblorense)*	April/May – September
Tejon poppy *(Eschscholzia lemmonii ssp. kernensis)*	February/March – May
Showy golden madia *(Madia radiata)*	March – May
San Joaquin woollythreds (*Monolopia congdonii*)	February – May
Oil neststraw *(Stylocline citroleum)*	March – April

All detected plant populations of Protected Species and Sensitive Species shall be identified in the field during the surveys with temporary flags or

other visible materials to avoid and minimize impacts to the plant populations from any disturbance activities.

b. No incidental take or relocation of any plant listed under the federal Endangered Species Act, the California Endangered Species Act, or the California Native Plant Protection Act may occur unless the incidental take is authorized by the United States Fish and Wildlife Service and/or the California Department of Fish and Wildlife in a permit or other authorization, or in an approved Habitat Conservation Plan or Natural Communities Conservation Plan. If focused plan surveys detect the presence of any listed plant, the plant populations shall be buffered from disturbance activities by implementing applicable impact avoidance protocols established by the United States Fish and Wildlife Service and/or the California Department of Fish and Wildlife unless incidental take authority is obtained. Projects covered under incidental take authority shall conduct activities in accordance with the take authorization. The qualified biologist may consult with the California Department of Fish and Wildlife to determine the recommended buffer distances required to prevent incidental take of a listed plant if avoidance protocols have not been established for the species. The qualified biologist shall confirm that all applicable listed plant buffers have been implemented prior to the commencement of any disturbance activity. All compensation for habitat loss shall be as determined through consultation with the wildlife agencies.

c. Sensitive species plant populations which are not Protected Species that may be impacted by new ground disturbing activities must be avoided by a 50-foot buffer, as delineated and implemented by a qualified biologist used by the Owner/operator.

MM 4.4-11 A Worker Environmental Awareness Program shall be developed and implemented for all personnel that could access the site prior to commencing any disturbance activities. The program shall consist of an on-site or center presentation that will describe the locations and types of sensitive plant, wildlife, and sensitive natural communities (collectively, "Biological Resources") on and near the site, an overview of the laws and regulations governing the protection of Biological Resources, the reasons for protecting the Biological Resources, the specific protection and avoidance measures that are applicable to the site, and the identity of designated points of contact should questions or issues arise, including the qualified biologist. The program shall provide training to recognize, avoid and report to applicable qualified biologists any Biological Resources on the site.

a. The Worker Environmental Awareness Program shall emphasize the need to avoid contact with onsite wildlife and avoid entry into areas where Biological Resources have been identified based on pre-disturbance field surveys and to implement the buffer avoidance or other protection measures established by the United States Fish and Wildlife Service shall

be identified California Department of Fish and Wildlife or required by the Biological Resource mitigation measures. The training shall emphasize the importance of not feeding or domesticating wildlife and the need to avoid any trash, micro trash, or potential food disposal on site except in animal-proof containers emptied daily to avoid attracting or causing adverse impacts to special status wildlife.

b. All onsite personnel must sign a statement verifying that they have completed the Worker Environmental Awareness Program, and that they understand and agree to implement the biological requirements for the worksite. If signed employee statements are not available, documentation may be provided by Worker Environmental Awareness Program training records, which shall be kept by the Owner/operator for a minimum of 5 years. Each Owner/operator shall maintain a list of all persons who have completed the training program and shall provide the list to the County or to state and federal wildlife agency representatives upon request.

MM 4.4-12 After construction, but before operation of any Class VI Injection well for the CCS project, a 500-foot wildlife protection buffer setback from the edge of the well pad shall be established and fenced to prevent wildlife from accessing the site. The qualified biologist shall conduct full clearance surveys before any fencing installation and monitor the installation. Reasonable measures shall be used by the Owner/Operator when servicing the well to control the site to ensure that gates are not left open such that wildlife are permitted to enter. The qualified biologist shall create a protocol for the workers to implement to review the site before closing the gate to ensure not wildlife are trapped inside and for allowing for the escape of any wildlife that does inadvertently enter the fenced buffer area. Any wildlife found that might have been affected by exposure to CO_2 shall immediately cause a shutdown of all injection operations, compliance with all requirements of the EPA Class VI UIC permit and onsite consultant with California Fish and Game and United States Fish and Wildlife Service.

MM 4.4-13 The following additional measures shall be implemented to avoid and minimize potential significant adverse impacts to Protected and Sensitive Species:

a. All vehicles shall observe a 20-mile-per-hour speed limit in all areas of disturbance and on unpaved roads unless otherwise posted. Off-road traffic outside of designated access routes is prohibited. Speed limit signs shall be posted in visible locations at the point of site entry and at regular intervals on all unpaved access roads.

b. All disturbance activities, except emergency situations or drilling that may require continuous operations, shall only occur during daylight hours. Nighttime disturbance activity for drilling purposes shall use directed lighting, shielding methods, and comply with applicable lighting mitigation measures.

c. All food-related trash items and all forms of micro trash, such as wrappers, cans, bottles, bottle tops, and food scraps shall be disposed of in closed, animal proof containers and removed daily from the site.

d. Excavations, spoils piles, access roadways, and parking and staging areas shall subject to dust control as set forth in the dust control mitigation measures.

e. The use of herbicides for vegetation control shall be restricted to those approved by the United States Fish and Wildlife Service and the California Department of Fish and Wildlife. No rodenticides shall be used on any site unless approved by the United States Fish and Wildlife Service, and the California Department of Fish and Wildlife, and shall observe label and other restrictions mandated by the United States Environmental Protection Agency, California Department of Food and Agriculture, and state and federal laws and regulations. For split estates, no herbicides for vegetation control may occur in Tier 2 areas without surface owner approval.

f. No plants or wildlife shall be collected, taken, or removed from the site or any adjacent locations except as necessary for project-related vegetation removal or wildlife relocation by a qualified biologist and subject to all applicable permits and authorizations.

g. All open trenches or excavations shall be covered at the end of each workday to prevent wildlife entrapment. If an excavation is too large to cover, escape ramps shall be installed at an incline ratio of no greater than 2:1. All trenches and pipes shall be inspected for the presence of wildlife each day prior to the commencement of work.

h. To enable San Joaquin kit foxes and other wildlife to pass through the project site, any perimeter fencing shall include a 4- to 8-inch opening between the fence mesh and the ground, or the fence shall be raised 4 inches above the ground except blunt-nosed leopard lizard exclusion fencing. The bottom of the fence fabric shall be knuckled (wrapped back to form a smooth edge) to protect wildlife.

i. All vertical tubes used in project construction and chain link fencing poles, shall be temporarily or permanently capped to avoid the entrapment and death of special-status wildlife and birds. All pipes 1.5 inches or greater in diameter stored overnight on a project location must have end caps or other physical barriers that prevent wildlife from entering the pipe. wildlife.

j. All dead or injured special status wildlife shall be left in place and reported to the United States Fish and Wildlife Service and the California Department of Fish and Wildlife within 48 hours of discovery for rescue or salvage. Discovery of state or federal listed species that are injured, or dead shall also be managed consistent with regulatory requirements, including being reported immediately via telephone and within 24 hours

in writing, and with a copy to Kern County Planning and_Natural Resources.

k. All drilling installations and operations will comply at all times with the applicable federal, State, county, and local law ordinances and regulations.

1. During pre-construction surveys, the qualified biologist shall delineate previously disturbed areas to be used by the Owner/operator to minimize the amount of new disturbance.

m. All concrete and asphalt debris should be removed from the site for recycling or disposal at an authorized, permitted facility.

n. No vehicles or construction equipment shall be parked within a wetland or waterbody/dry wash.

o. Tracked vehicles and other construction equipment must be washed or maintained to be weed-free prior to entering and working within areas of new disturbance.

p. All washing of trucks, paint, equipment, or similar activities should occur in areas where runoff is fully contained for collection and off-site disposal. Wash water may not be discharged from the site and shall be located at least 100 feet from any water body, or sensitive Biological Resources.

q. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries or waterbody, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.

r. All areas that must be avoided as result of the pre-disturbance surveys, and areas where new disturbance will occur, shall be clearly delineated by fencing or staking and flagging and/or rope or cord.

s. No firearms shall be allowed on any site.

t. No pets shall be allowed on any site.

u. No smoking may occur except in designated areas.

MM 4.4-14 The following additional measures shall be implemented to avoid and minimize potential significant adverse impacts to temblor legless lizard:

a. Protocol/focused and pre-disturbance surveys shall be conducted using a CDFW-approved methodology to determine the presence of temblor legless lizard at and/or near the project area.

b. If temblor legless lizards are detected during protocol/focused surveys, a temblor legless lizard avoidance plan shall be prepared for the project that will result in avoidance of incidental take. At a minimum, the temblor legless lizard avoidance plan shall be submitted for approval to the California Department of Fish and Wildlife and the County.

c. In the event that complete avoidance of the temblor legless lizard is not feasible, MM 4.4-2 shall be implemented.

MM 4.4-15 The following additional measures shall be implemented to avoid and minimize potential significant adverse impacts to Crotch's bumble bee:

a. Protocol/focused surveys for Crotch's bumble bee and its requisite habitat features shall be conducted by a qualified biologist during the blooming period immediately prior to project construction following the methodology outlined in the Survey Considerations for California Endangered Species Act Candidate Bumble Bee Species (CDFW 2023).

b. If Crotch's bumble bee is detected during biological monitoring or observed at any point, the California Department of Fish and Wildlife and the United States Fish and Wildlife Service shall be notified to determine what additional measures would be necessary to prevent take of the species.

c. In the event that complete avoidance of Crotch's bumble bee is not feasible, MM 4.4-2 shall be implemented.

Mitigation Measures

Implement MM 4.4-1 through 4.4-15, as described above.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.4-2: 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 Wildlife or United States Fish and Wildlife Service

The project area does not overlap any USFWS designated critical habitat. One sensitive plant community, Valley saltbush scrub, would be impacted by project activities. Although the existing Valley saltbush scrub habitat consists of highly isolated fragments surrounded by existing oil and gas disturbance and the project area largely follows established pipeline ROWs, impacts to sensitive natural communities and riparian habitats in the project area would be potentially significant without mitigation. Implementation of MM 4.4-16 and MM 4.4-17 would require pre-disturbance surveys and restrictions on land disturbance activities within the project area to minimize impacts to sensitive natural communities within the project area.

Mitigation Measures

MM 4.4-16 Pre-disturbance surveys shall be conducted by a qualified biologist during the appropriate periods for detecting Sensitive Natural Communities that could occur within the project area. The surveys shall be completed consistent with applicable protocols approved by the United States Fish and Wildlife Service and/or the California Department of Fish and Wildlife, including the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009). The qualified person shall map and identify all sensitive natural communities, including riparian communities that occur in or within 100 feet of any new disturbance area. The site plan for the proposed activity shall identify waters, wetlands, resources subject to section 1600 of the CFGC, and other riparian habitats that occur in and within 100 feet of the disturbance area.

MM 4.4-17 No land disturbance activity in any Sensitive Natural Community that requires a state or federal permit, including state or federally regulated wetlands and waters, shall occur unless the activity is specifically authorized by the issuance of permits or approvals as required by state and federal law. This provision is not intended to restrict survey activities or restrict permit approvals for such disturbance activities. However, no new wells, tanks, sumps or ponds shall be constructed within 50 feet of federal or state waters or wetlands.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.4-3: Have a Substantial Adverse Effect on Federally Protected Wetlands as Defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through Direct Removal, Filling, Hydrological Interruption, or Other Means

A formal wetland delineation was not conducted for the proposed project. Based on desktop review; it is not anticipated that jurisdictional aquatic resources are present that will be directly impacted, and the project will avoid these features to the extent feasible, such as spanning drainages along the project area. However, if avoidance is impractical, to minimize impact to potential waters of the State and fulfill the regulatory requirements associated with discharges to waters of the State, mitigation measures MM 4.4-16 and 4.4-17 will be implemented should the project design impact the existing ephemeral features. If the riverine feature is not determined to be Waters of the State or under the jurisdiction of any agency, mitigation measures would not be warranted.

Implementation of the Biological Resources mitigation measures such as MM 4.4-13, MM 4.4-16 and MM 4.4-17 would ensure that project activities would not disturb state or federally regulated wetlands and waters unless the activity is specifically authorized by the issuance of permits or approvals as required by state and federal laws and that activities in the vicinity of wetlands and water bodies would not adversely disturb them. Other mitigation measures identified in this EIR

would further reduce potential state or federally jurisdictional wetland and waters, including dust control, spill and hazardous material avoidance and containment, surface and subsurface water quality and hydrology, mitigation measures.

Mitigation Measures

Implement MM 4.4-13, MM 4.4-16 and MM 4.4-17, as previously identified.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.4-4: Interfere Substantially with the Movement of Any Resident or Migratory Fish or Wildlife Species or with Established Resident or Migratory Wildlife Corridors or Impede the Use of Wildlife Nursery Sites

The project area is located within two identified wildlife connectivity corridors, the Essential Connectivity Area and Core Area (Figure 4.4-1). Implementation of the Biological Resources mitigation measures would reduce wildlife movement impacts. Other mitigation measures identified in this EIR to further reduce wildlife movement impacts, include dust control, nighttime lighting, noise controls, spill and hazardous material avoidance and containment, and surface and subsurface water quality and hydrology (including but not limited to Kern River and Poso Creek channels), measures. Implementation of the Biological Resources mitigation measures such as MM 4.4-1, MM 4.4-3, MM 4.4-8, MM 4.4-11, and MM 4.4-13 would reduce wildlife movement impacts to less than significant.

Mitigation Measures

Implement MM 4.4-1, MM 4.4-3, MM 4.4-8, MM 4.4-11, and MM 4.4-13, as previously identified.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.4-5: Conflict with Any Local Policies or Ordinances Protecting Biological Resources, Such as a Tree Preservation Policy or Ordinance

The project does not conflict with the KCGP and is not subject to any local ordinances. Therefore, there are no impacts with respect to local policies and ordinance, and no mitigation measures are required.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.4-6: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Conservation Community Plan, or Other Approved Local, Regional, or State Habitat Conservation Plan

As discussed above in the Regulatory Setting, the project would be located within the CAMP, which includes a Section 2081 ITP for the take of CESA-listed species incidental to ongoing oil and gas extraction, processing, and related activities. If the project proponent elects in the future to pursue any disturbance within the CAMP that requires additional take authorization, conflicts with the CAMP would be potentially significant. Therefore, per MM 4.4-2, additional Section 2081 ITP(s) would be obtained as required by the CAMP.

The CAMP does include some "Covered Activities" that are outside the scope of activities included in the project (e.g., hazardous substance remediation activities), but the project does not impose any requirements that are inconsistent with or would otherwise preclude ongoing implementation of Covered Activities in the CAMP. Therefore, with the implementation of MM 4.4-2, the project would not conflict with any other adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or state habitat conservation plan.

Mitigation Measures

Implement MM 4.4-2, as described above.

Level of Significance After Mitigation

Impacts would be less than significant.

4.4.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement CCS projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court

of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

Section 4.4, *Biological Resources* of the Oil and Gas EIR has facts and evidence for the record on the natural lands as well as species in all the oilfields. Section 4.4, *Biological Resources*, of the Oil and Gas EIR has facts and evidence for the record on the natural lands as well as species in all the oilfields.

The aforementioned documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate Bill [SB] 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the county permitting years (2016, 2017, 2018, 2019, 2020, 2021, 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2, 000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to biological resources is considered the western section of Kern County near the floor of the San Joaquin Valley. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on biological resources. This geographic scope of analysis is appropriate because the biological resources within this area are expected to be similar to those in the project site because of their proximity.

Impact 4.4-7: Contribute to Cumulative Biological Resource Impacts

The project site is located approximately 26 miles from the City of Bakersfield, approximately 8.5 miles from the City of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow. The project area is bordered on all sides by existing oil and gas exploration and production. Existing land use in the outside of the project area generally includes agricultural lands, current, past and abandoned oil and gas exploration and production land, and undeveloped land. State and federal lands within the oil and gas reserve are managed primarily to conserve biological resources. Certain state or federal lands surrounding the project site are subject to commercial uses, including leases for oil and gas exploration and development, which have biological resources similar in quality to the project site.

Future activities within the oil and gas reserve including those related to the proposed project could contribute to a significant cumulative impact on project area biological resources because future

use and development of federal, state and incorporated urban lands are not within the County's jurisdiction or control. Future land uses and development could affect biological resources in each of these jurisdictions and would be undertaken as independent actions with associated impacts, avoidance and minimization requirements, and mitigation, if required, under applicable federal, state, regional and local agency law.

Although the cumulative impacts from the proposed project will be less than significant due to the CCS Surface Land use restrictions, other clean energy projects that are in the valley portion of Kern County has the potential to impact species and reduce habitat. Therefore, the cumulative impacts of the project when combined with other known and unknown projects, would be significant and unavoidable. All reasonable and feasible mitigation measures have been evaluated and included.

Mitigation Measures

Implement MM 4.4-1 through MM 4.4-17, as described above.

Level of Significance After Mitigation

Cumulative impacts would be significant and unavoidable.

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Section 4.5

Cultural Resources

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Section 4.5

Cultural Resources

4.5.1 Introduction

This section of the Environmental Impact Report (EIR) provides contextual background information on historical resources in the project site, including the area's prehistoric, ethnographic, and historical settings. This section also summarizes the results of preliminary cultural surveys of the project site and analyzes the impacts on cultural resources that would result from implementation of the California Resources Corporation's (project proponent) proposed Carbon TerraVault I (Kern County) Project (project) and identifies mitigation measures to address adverse impacts. The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft and approximately 4 miles from the unincorporated community of Buttonwillow.

A description of the environmental setting (affected environment) for cultural resources is presented below in Section 4.15.2, *Environmental Setting*. The regulatory setting applicable to cultural resources is presented in Section 4.15.3, *Regulatory Setting*, and Section 4.15.4, *Impacts and Mitigation Measures*, discusses project impacts and associated mitigation measures.

This section is based on the Cultural Resources Review and Native American Consultation Summary Report prepared by ASM Affiliates (ASM 2023; Appendix D) and the Kern County *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015), supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding oilfield environmental impacts and cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152).

The cultural resources report and Native American consultation was conducted for purposes of compliance with CEQA and Assembly Bill 52. Due to the confidential nature of the location of cultural resources, this evaluation does not include maps or location descriptions and is not included in the appendix. The project's potential impacts on tribal cultural resources are addressed in Section 4.18, *Tribal Cultural Resources*.

Cultural Resource Terminology

For the purposes of CEQA, "historical resources" generally refer to cultural resources that have been determined to be significant, either by eligibility for listing in state local registers of historical resources, or by determination of a lead agency (see definitions below). Historical resources can

also include areas determined to be important to Native Americans such as "sacred sites." Sacred sites are most often important to Native American groups because of the role of the location in traditional ceremonies or activities. "Cultural resources" generally refer to prehistoric and historical period archaeological sites and the built environment. Cultural resources can also include areas determined to be important to Native Americans.

For the purpose of this Cultural Resources section, the "project footprint" is defined as the area of disturbance associated with proposed facilities located on the surface of the project site, including associated infrastructure.

Below are definitions of key cultural resources terms used in this section:

- **Alluvium:** a fine-grained fertile soil consisting of mud, silt, and sand deposited by flowing water on flood plains, in riverbeds, and in estuaries.
- **Archaeological Site:** A site is defined by the National Register of Historic Places (NRHP) as the place or places where the remnants of a past culture survive in a physical context that allows for the interpretation of these remains. Archaeological remains usually take the form of artifacts (e.g., fragments of tools, vestiges of utilitarian, or non-utilitarian objects), features (e.g., remnants of walls, cooking hearths, or midden deposits), and ecological evidence (e.g., pollen remaining from plants that were in the area when the activities occurred). **Prehistoric archaeological sites** generally represent the material remains of Native American groups and their activities dating to the period before European contact. In some cases, prehistoric sites may contain evidence of trade contact with Europeans. **Ethnohistoric archaeological sites** are defined as Native American settlements occupied after the arrival of European settlers in California. **Historic archaeological sites** reflect the activities of nonnative populations during the Historic period.
- **Artifact:** An object that has been made, modified, or used by a human being.
- **Cultural Resource:** A cultural resource is a location of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. Cultural resources include archaeological resources and built environment resources (sometimes known as historic architectural resources), and may include sites, structures, buildings, objects, artifacts, works of art, architecture, and natural features that were important in past human events. They may consist of physical remains or areas where significant human events occurred, even though evidence of the events no longer remains. Cultural resources also include places that are considered to be of traditional cultural or religious importance to social or cultural groups.
- **Cultural Resources Study Area:** All areas within the project site boundary plus a 1-mile buffer.
- **Cultural Resources Survey Area:** All areas of potential permanent and temporary impacts for a reasonable worst-case development within the project site, plus a 60-foot buffer to account for secondary or unanticipated impacts.

- **Ethnographic:** Relating to the study of human cultures. "Ethnographic resources" represent the heritage resource of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource-collecting areas, ceremonial sites, value-imbued landscape features, cemeteries, shrines, or ethnic neighborhoods and structures.
- **Historic period:** The period that begins with the arrival of the first nonnative population and thus varies by area. In 1772, Commander Don Pedro Fages was the first European man to enter Kern County, initiating the historic period in the project study area.
- **Historical resource:** This term is used for the purposes of CEQA and is defined in the CEQA Guidelines (§15064.5) as: (1) a resource listed in, or determined to be eligible for listing in the California Register of Historical Resources (CRHR); (2) a resource included in a local register of historical resources, as defined in Public Resources Code (PRC) §5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC §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.
- **Holocene:** Of, denoting, or formed in the second and most recent epoch of the Quaternary period, which began 10,000 years ago at the end of the Pleistocene.
- **Isolate:** An isolated artifact or small group of artifacts that appear to reflect a single event, loci, or activity. It may lack identifiable context but has the potential to add important information about a region, culture, or person. Isolates are not considered under CEQA to be significant and, thus, do not require avoidance mitigation (CEQA Statute §21083.2 and CEQA Guidelines §15064.5). All isolates located during the field effort, however, are recorded and the data are transmitted to the appropriate California Historical Resources Information System Information Center.
- **Lithic:** Of or pertaining to stone. Specifically, in archaeology lithic artifacts are chipped or flaked stone tools, and the stone debris resulting from their manufacture.
- **Native American sacred site:** An area that has been, and often continues to be, of religious significance to Native American peoples, such as an area where religious ceremonies are practiced or an area that is central to their origins as a people. They also include areas where Native Americans gather plants for food, medicinal, or economic purposes.
- **Pleistocene (Ice Age):** An epoch in the Quaternary period of geologic history lasting from 1.8 million to 10,000 years ago. The Pleistocene was an epoch of multiple glaciation, during which continental glaciers covered nearly one fifth of the earth's land.
- **Prehistoric period:** The era prior to 1772. The latter part of the prehistoric period (post-1542) is also referred to as the protohistoric period in some areas, which marks a transitional period during which native populations began to be influenced by European presence resulting in gradual changes to their lifeways.

- **Quaternary Age:** The most recent of the three periods of the Cenozoic Era in the geologic time scale of the International Commission on Stratigraphy. It follows the Tertiary Period, spanning 2.588 ± 0.005 million years ago to the present. The Quaternary includes two geologic epochs: the Pleistocene and the Holocene Epochs.
- **Stratigraphy:** The natural and cultural layers of soil that make up an archaeological deposit, and the order in which they were deposited relative to other layers.
- **Unique Archaeological Resource:** This term is used for the purposes of CEQA and is defined in the CEQA Guidelines (§15064.5) as 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 either contains information needed to answer important scientific research questions; 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.

4.5.2 Environmental Setting

The proposed project site is located within Elk Hills, which comprises an approximately 75-square-mile (47,800-acre) complex in the San Joaquin Valley of unincorporated Kern County. The project area is bounded by Kings and Tulare Counties to the north, Santa Barbara and San Luis Obispo Counties to the west, the Tehachapi Mountains and the Sierra Nevada Mountains to east, and the northern boundary of the Los Padres National Forest to the south.

The project area is characterized by heavy oil and gas exploration and production including existing well pads, processing facilities, pipeline routes, and access roads. Development in the surrounding area is predominantly oil and gas production, agricultural, and municipalities such as the towns of McKittrick, Tupman, Taft, and Buttonwillow. The project area boundaries encompass a mix of parcels that have been owned and used for oil and gas production or on which leases have been acquired by the project proponent for intended future oil and gas production. The boundaries of the Carbon Capture and Storage (CCS) Surface Land Area and Underground Approved Storage Area (pore space) for the project area is approximately 26 miles from the City of Bakersfield, approximately 8.5 miles from the City of Taft, 5 miles from the unincorporated community of Tupman approximately, and 4 miles from the unincorporated community of Buttonwillow. The closest community to the injection and capture facilities is McKittrick, 4.5 miles away.

Prehistoric Setting

The southern San Joaquin Valley region has received minimal archaeological attention compared to other areas of the state. This is due, in part, to the fact that the majority of California archaeological work has been concentrated in the Sacramento Delta, Santa Barbara Channel, and Mojave Desert areas. Although knowledge of the prehistory of the project area is limited in specific details, enough is known to conclude that the archaeological record is broadly similar to central and especially south-central California as a whole. Therefore, the general prehistory of the project area can be outlined as provided in the following sections.

Early Holocene (12,000 to 7,000 B.P.)

Initial occupation of the region occurred at least as early as the Paleoindian Period, or prior to about 10,000 years before the present (B.P.). Evidence of this early use of the region has been revealed by the repeated discovery of characteristic fluted and stemmed projectile points found around the margins of Tulare and Buena Vista lakes, in the foothills of the Sierra Nevada, and in the Mojave Desert. These finds suggest a terminal Pleistocene/early Holocene lakeshore adaptation similar to that found in other portions of the Far West at this same time, although little else is known about these earliest peoples. Importantly, many of the identified and characteristic projectile points have been discovered in lakeshore deposits, below the historic lake high-stands, reflecting the fact that this earliest period was a time of drought, with lake levels subsequently rising.

Middle Holocene (7,000 to 4,000 B.P.)

Substantial evidence for human occupation of California first occurs during the middle Holocene, from roughly 7,500 to 4,000 B.P. This period is known as the Early Horizon and is sometimes alternatively referred to as the Early Millingstone along the Santa Barbara Channel. In the coastal area, population concentrated along the shore, with minimal visible use of inland areas. Adaptation appears to have emphasized hard seeds and nuts, with toolkits dominated by mullers and grindstones (manos and metates). Minimal evidence of Early Horizon occupation has been found in most inland portions of the state. In part, this is due to a severe cold and dry paleoclimatic period that occurred at this time. Evidence for an Early Horizon occupation of southern San Joaquin Valley is limited, and primarily consists of some early dates from the west side of Buena Vista Lake. While this indicates that the occupation of the west side of this lake, and thus portions of the Western Subarea, extends back for 7,000 or more years, it is clear overall that Early Horizon population density was low in interior south-central California, and probably throughout the project area. For example, very little evidence for Early Horizon sites has been found in the Tehachapi Mountains or Carrizo Plain to the west.

Late Holocene I (4,000 to 2,000 B.P.)

Environmental conditions improved dramatically after about 4000 B.P. during the Middle Horizon (or Intermediate Period). This period is known climatically as the Holocene Maximum, and it was characterized by significantly warmer and wetter conditions than had been experienced previously (or than occur today). It was marked archaeologically by a large population increase and radiation into new environments along the south-central California coast, the southern Sierra Nevada, and the Mojave Desert. In the Sacramento Delta region to the north, this same period of favorable environmental conditions was marked by the appearance of the Windmiller culture, which exhibited a high degree of ritual elaboration (especially in burial practices) and perhaps even a rudimentary mound-building tradition. Along with ritual elaboration, Middle Horizon times experienced increasing subsistence specialization, perhaps correlating with the appearance of the acorn-processing technology. Penutian-speaking peoples (including the Yokuts) are also posited to have entered the state, roughly at the beginning of this period and, perhaps, to have brought this technology with them. Likewise, the so-called “Shoshonean Wedge” in southern California, or the

Takic-speaking groups that included the Gabrielino/Fernandeño, Tataviam, and Kitanemuk, appear to have moved into this region at about this time.

Test excavations have demonstrated a substantial Middle Horizon occupation in the Tehachapi Mountains; all habitation sites included at least some deposit from this period, and some of the villages were only inhabited at this time. A significant population increase is believed to have occurred in the Carrizo Plain, as well. The existing evidence, in fact, suggests that a similar pattern occurred in the inland Ventura County region, as well as possibly in the Antelope Valley and western Mojave Desert, the southern Sierra Nevada, and the Coso Range region. A major expansion in settlement, the establishment of large site complexes, and an increase in the range of environments exploited appear to have occurred throughout this wide region roughly around 4,000 years ago. Although most efforts to explain this expansion have focused on very local circumstances and events, this was a major Southern California-wide occurrence.

Late Holocene II, III (2,000 to 1,100 B.P.; 1,100 to 300 B.P.)

The beginning of the Late Horizon is set variously at 1500 and 800 B.P., although a consensus seems to be growing for the shorter chronology for this period. Regardless of the specific date, the appearance of the Late Horizon correlates with another series of periodic droughts at circa Anno Domini (A.D.) 800–1200, which decimated major portions of western North America. This is known, climatically, as the Medieval Climatic Anomaly, followed by the Little Ice Age, and this general period of climatic instability extended to about A.D. 1860. In much of inland south-central California, the Carrizo Plain, and the Mojave Desert, a large-scale abandonment of sites occurred approximately at the start of this period. For the ancestral Chumash, this appears to correlate with an increase in coastal populations, suggesting a shift from inland to seashore occupation rather than a drop in total numbers of people.

In contrast, along Buena Vista Lake, population appears to have been increasingly concentrated towards the later end of the Medieval Climatic Anomaly. Similarly, the Late Horizon environmental collapse did not result in widespread abandonment in the Tehachapi Mountains. This area is unusually well-watered and probably was not subjected to the same degree of desiccation as occurred elsewhere in interior south-central California. Some Middle Horizon villages were abandoned before the start of the Late Horizon, but those sites with Late Horizon occupation appear to have been more intensively occupied during the last 1,000 years, and no significant population change has yet been identified.

The Tehachapi Mountains and southern San Joaquin Valley then experienced intensification rather than the abandonment seen in surrounding areas during the last millennium. This most likely resulted from favorable (i.e., better watered) environments. Regardless of regional circumstance, the ethnographic Native American tribes and conditions are recognized as a direct outgrowth of the Late Horizon occupations of this portion of south-central California.

The identified prehistoric record in the project area has a series of implications for cultural resource management. The first is that a full range of site types are present. These include:

- Villages, primarily located on or near permanent water sources, occupied by large groups during the winter aggregation season
- Seasonal camps, again typically located at water sources, occupied during other parts of the year tied to locally and seasonally available food sources
- Special activity areas, especially plant processing locations containing bedrock mortars, commonly (though not exclusively) near existing oak woodlands, and invariably at bedrock outcrops or exposed boulders
- Stone quarries and tool workshops, occurring in two general contexts: (1) at or below naturally occurring chert exposures on the eastern front of the Temblor Range; and (2) at quartzite cobble exposures, often on hills or ridges
- Ritual sites, most commonly pictographs (rock art) found at rockshelters or large exposed boulders, and cemeteries, both commonly associated with villages
- A variety of small lithic scatters (low-density surface scatters of stone tools)

The second implication for cultural resources management in the project area is that the locations of the water sources have sometimes changed over time, so villages and camps are not exclusively associated with existing (or known historical) water sources. The sizes and locations of the project area's lakes, sloughs, and Kern River delta channels changed significantly during the last 12,000 years due to major paleoclimatic shifts. This altered the area's hydrology and, thus, prehistoric settlement patterns. The western shoreline of the Buena Vista Lake, the largest of the three lakes, was relatively stable, because it abutted the series of low hills in the Western Subarea. However, the northern, southern and eastern shorelines comprised the near-flat valley floor. Relatively minor fluctuations up or down in the lake level resulted in very significant changes in the areal expression of the lake on these three sides and, therefore, the locations of villages and camps. Although perhaps not as systematic, similar changes occurred with respect to stream channels and sloughs and potential site locations associated with them. This circumstance has implications for predicting site locations and archaeological sensitivity. Although discussed in more detail below, site sensitivity is hardest to predict in the open valley floor, especially in the Kern River delta area, near the northern, southern, and eastern shorelines of Buena Vista Lake, as well as around Kern Lake, due to fluctuating surface water levels.

Ethnographic Setting

The area that is now the Oil and Gas Region of Kern County was a contact point between three separate tribal groups immediately prior to the arrival of Euro-Americans in California: the southern Valley Yokuts, interior Chumash, and Kitanemuk-Haminat. These three groups were bordered at higher elevations by the Kawaiisu, in the Tehachapi area, and the Tubatulabal, in the Kern River Valley.

The San Joaquin Valley floor and, thus, the majority of the Oil and Gas Region of Kern County, was occupied by southern Valley Yokuts speakers, themselves divided into a series of autonomous "tribelets," the boundaries of which are not well defined. The Yauelmani Yokuts lived from the

Kern River area, in modern Bakersfield, to the southeast corner of the valley, on the present-day Tejon Ranch. The Hometwali were centered around Kern Lake, while the Tulamni occupied the west side of Buena Vista Lake and the foothills of the Temblors, at least to McKittrick. The Tuhohi resided from the Kern River delta north to the Goose Lake area and west to the sloughs near Buttonwillow. Yokuts villages apparently extended up to, but not into, the mouths of the canyons on the northern and western fronts of the Tehachapi Mountains, well into the foothills and lower elevations of the Sierra Nevada on the east, and to the crest of the Temblor Range on the west. The Yokuts are Penutian speakers and are linguistically related to northern occupants of the San Joaquin Valley.

The Kitanemuk occupied the south and central "heart" of the Tehachapi Mountains and the adjacent northwestern end of the Antelope Valley. These are speakers of the Serran branch of the Takic branch of the Uto-Aztecan language stock, and they are sometimes referred to as Haminat. They were closely related linguistically to other Serran Takic groups, such as the Serrano proper and Vanyume, who lived along the northern front of the Transverse Ranges. The Kitanemuk, however, probably did not extend any distance down onto the San Joaquin Valley floor, which was occupied by the Yokuts. The westernmost Kitanemuk occupation appears to have been at or near Pastoria Creek, judging from known village locations, with most of their villages found farther east and south. Historic villages are known at the Pastoria, Tunis, El Paso, Tejon, and Chanac canyon mouths.

Chumash tribal territory is commonly viewed as focused on the Malibu to San Luis Obispo coast, but the interior Chumash extended to the edge of the southern San Joaquin Valley floor, from Grapevine Canyon westward. Chumash occupied four historic villages in canyon mouths on the present-day Tejon and San Emidgio Ranches. The interior Chumash in this region most likely spoke Ventureño Chumash. The various Chumash languages are members of the Hokan linguistic stock, believed to be one of the oldest language families in the Americas.

Despite the apparent linguistic distinctions between these three groups, their lifeways were in many instances similar, reflecting widespread adaptive patterns in south-central California, as well as a deep and shared series of cultural traditions.

The Chumash, for example, followed a hunting-gathering-fishing subsistence pattern that incorporated a heavy reliance on maritime resources, including pelagic and littoral fish, and shellfish, at least for groups living along the coast. The sea resources that they exploited may have been a key factor in their evolutionary success; at the time of the arrival of the Spanish, the Chumash had reached levels of population density and complexities in social organization unequaled worldwide by other non-farming groups. These included permanent coastal villages along the Santa Barbara Channel area containing as many as 1,000 inhabitants, as well as a hierarchical sociopolitical organization consisting of at least two major chiefdoms. Further, based on recent reconstructions using mission registers, the Chumash appear to have had a matrilocal and, perhaps, matrilineal clan-based society.

The interior Chumash lacked direct access to the marine resources that contributed to such unusually high population densities along the Santa Barbara coastline. Adaptation to the

environment was, therefore, more closely tied to terrestrial resources, especially the acorn-bearing oak, with cultural patterns, in general, very similar to surrounding interior groups, such as the Yokuts. Notably, however, the interior Chumash are particularly renowned for their rock paintings or pictographs, important concentrations of which are located on the San Emigdio Ranch and the Carrizo Plain.

Yokuts groups, in contrast, were organized in recognized and distinct tribelets (i.e., landowning groups linked by their shared territory and descent from a common ancestor). Depending upon tribelet location, subsistence emphasized the acorn-bearing oak, with the addition of a wide variety of other plants, fish, and game, or the bountiful lacustrine resources found around lakeshore environments.

Less ethnographic information exists on the Kitanemuk. Like many south-central California groups, however, the Kitanemuk were most likely divided into tribelets, with political organization and subsistence practices similar to their Yokuts neighbors. Following the acquisition of California by the United States, a Native American reserve was created on the Tejon Ranch in 1853 by Edward F. Beale. The so-called Sebastian Indian Reserve was created, in part because the influx of Euro-American settlers into the San Joaquin Valley had created unrest and resistance among tribal groups. The reserve was intended to be multi-tribal and was primarily occupied by Kitanemuk, Yokuts, and Chumash peoples, but also included members of other tribes such as the Tubatulabal, Kawaiisu, and (from the Los Angeles Basin) the Fernandeño. The reserve was disbanded and moved to Porterville following the Civil War, but a number of Native American families stayed on the Tejon Ranch, ultimately living exclusively in Tejon Canyon. Following the White Wolf Earthquake of 1952, most of the community moved to the Bakersfield area, but the last family continued to reside in Tejon Canyon until the mid-1960s. This multi-tribal community was the origin of the contemporary Tejon Indian Tribe, currently the only federally recognized tribe in Kern County.

Historic Context

The historic account of early exploration and development within the Oil and Gas Region of Kern County, described below, is derived from the Kern County Oil and Gas EIR.

Early Exploration and Development

Oil exploration, and consumption are inextricably woven into the history of California and, in particular, Kern County. Spanish explorers visited the southern end of the San Joaquin Valley in 1772, but its lengthy distance from the missions and presidios along the Pacific Coast delayed permanent settlement for many years, including during the Mexican period of control over the Californian region. In the 1840s, Mexican rancho owners along the Pacific Coast allowed their cattle to wander and graze in the San Joaquin Valley. The Mexican government granted the first ranchos in the southern part of the San Joaquin Valley in the early 1840s, but these did not result in permanent settlement. It was not until the annexation of California in 1848 that the exploitation of the southern San Joaquin Valley occurred.

Agriculture

The discovery of gold in northern California in 1848 resulted in a dramatic increase in population, consisting, in good part, of fortune seekers and gold miners who began to scour the rest of the state. In 1851, when gold was discovered in the Sierra Nevada Mountains in eastern Kern County, the population of the area grew rapidly. Some new immigrants began ranching in the San Joaquin Valley to supply the miners and mining towns. Ranchers grazed cattle and sheep, and farmers dry-farmed or used limited irrigation to grow grain crops, leading to the creation of small agricultural communities throughout the valley.

After the annexation, the southern San Joaquin Valley became significant as a center of food production for this new influx of people in California. The expansive unfenced and principally public foothill spaces were well-suited for grazing both sheep and cattle. As the Sierra Nevada gold rush presented extensive financial opportunities, ranchers introduced new breeds of livestock, consisting of cattle, sheep, and pig.

Along with the dramatic increase of ranching in the southern San Joaquin Valley came the dramatic change in the landscape, as nonnative grasses more beneficial for grazing and pasture replaced native flora. After the passing of the Arkansas Act in 1850, efforts were made to reclaim small tracts of land in order to create more usable spaces for ranching. Eventually, as farming supplanted ranching as a more profitable enterprise, large tracts of land began to be reclaimed for agricultural use, aided, in part, by the extension of the railroad to the region in the 1870s.

Following the passage of statewide "No-Fence" laws in 1874, ranching practices began to decline, while farming expanded in the San Joaquin Valley in both large land holdings and smaller, subdivided properties. As the farming population grew, so did the demand for irrigation. Settlers began reclamation of wetland areas in 1866 and built small dams across the Kern River to divert water into the fields. By 1880, 86 different groups were taking water from the Kern River. Ten years later, 15 major canals provided water to thousands of acres in Kern County.

During the period of reclaiming unproductive land in the southern San Joaquin Valley, grants were given to individuals who had both the resources and the finances to undertake the operation alone. One small agricultural settlement, founded by Colonel Thomas Baker in 1861 after procuring one such grant, took advantage of reclaimed swampland along the Kern River. This settlement became the City of Bakersfield in 1869, and quickly became the center of activity in the southern San Joaquin Valley and in the newly formed Kern County. Located on the main stage road through the San Joaquin Valley, the town became a primary market and transportation hub for stock and crops, as well as a popular stopping point for travelers on the Los Angeles and Stockton Road. The Southern Pacific railroad reached the Bakersfield area in 1873, connecting it with important market towns elsewhere in the state and dramatically impacting both agriculture and oil production.

The San Joaquin Valley was dominated by agricultural pursuits until the oil boom of the early 1900s, which saw a shift in the region, as some reclaimed lands previously used for farming were leased to oil companies. The shift of the San Joaquin Valley towards oil production did not halt the continued growth of agriculture. The Great Depression of the 1930s brought with it the arrival of

great number of migrants from the drought-affected Dust Bowl region looking for agricultural labor. These migrants established temporary camps in the valley, staying on long past the end of the drought and the Great Depression, and eventually settling in towns such as Bakersfield.

Petroleum and Railway Development

While mining and agriculture led to the settlement of Kern County, the exploitation of the San Joaquin Valley's petroleum resources became the primary industry of the area in the late 19th and 20th centuries. Historically, early European settlers noticed oil seeping from the ground and that Native Americans in the area used it to waterproof their tule balsas (reed boats). The new settlers used the petroleum as axle grease and lubrication for farm machinery. The use of petroleum did not begin in earnest until the Civil War, when the Union's supply of illuminating oil from Confederate sources was interrupted. Kerosene was used as a substitute, and the Buena Vista Oil Refinery, the first in California, was established for this purpose in 1864, near McKittrick.

The beginning of oil industry development in the southern San Joaquin Valley began on the western side, with the first oil well drilled in 1877 and the first wooden oil derrick raised in 1887. By 1899, there were three oilfields established: (1) on the west side of the valley; (2) McKittrick and Midway-Sunset; and (3) with Kern River on the northeast of Bakersfield. The establishment of the western oilfields was greatly aided by the extension of the rail line to McKittrick in 1893. Thus, the expansion of the railways into the southern San Joaquin Valley was directly tied to, and symbiotic with, the drilling and production of the oil industry.

The McKittrick oilfield was originally established for the exploitation of asphaltum and was subsequently the site of the first oil well and derrick. The area's rapid oil development was aided by the discovery of Klondike Oil Company's Shamrock Gusher in 1896, which produced, on average, 1,300 barrels per day. Thirty miles west of Bakersfield, the early development of the McKittrick oilfield was initially hindered by its remote location. Growth continued after the railway extension and, by 1914, McKittrick had 270 producing wells that were responsible for the production of 103,000 barrels of oil between 1903 and 1914. By 1943, McKittrick oilfield comprised 1,545 acres, with 250 producing wells and yielding 100 million barrels of oil.

The Midway and Sunset oilfields were initially unconnected, separated by the Mount Diablo/San Bernardino baseline. With the first well drilled in the Sunset field in 1891, and systematic production beginning in 1894, the field became economically significant by 1900, when the 18 wells produced 12,500 barrels of oil. Within 10 years, this increased to 9.2 million barrels, in large part due to the discovery and exploitation of the Lakeview Gusher in 1909, producing 7 million barrels in the subsequent year. After its development in 1900, Midway field entered heavy production and, by 1916, was producing 32 million barrels. Combined, the Midway and Sunset fields contained 1,710 producing wells. During the period from 1913 to 1916, the Midway and Sunset fields were responsible for roughly 50 percent of California's oil production.

The Kern River oilfield originally consisted of a hand-dug pit located 5 miles north of Bakersfield, near the Kern River, in 1899. As the first oilfield on the east side of San Joaquin Valley, its immediacy to Bakersfield and the main railway lines stimulated rapid development. By 1900, the

field comprised 130 producing wells with a Southern Pacific railroad spur line. The field continued to thrive, producing 16 million barrels of oil in 1903. Boomtowns sprang up around the area, including Oildale, Oil Center, and Oil City. In turn, Bakersfield prospered from this proximity, eventually expanding to absorb these small boomtown communities. By 1914, the Kern River Oilfield covered 10 square miles with 1,675 wells producing 167 million barrels of oil.

The turn of the 20th century brought with it the demand for crude oil, as it became the primary source of fuel for ships, railroad locomotives, automobiles, and farm machinery. In contrast to previous oil production procedures, which were primarily comprised of guesswork and hard labor, new efforts were made at standardization. Scientific methods were used to gauge where to place oil derricks and pipelines, as well as new drilling techniques to minimize loss of oil.

In order to compensate for the growth of the oil industry, the southern San Joaquin Valley experienced a growth in small oil towns and settlements. Even with the advancement of railroads in the region, many of the most profitable oilfields were in remote locations, often requiring horse drawn carriages to haul barrels of oil to the railroads. These "lease towns," often no more than campsites, sprang up along the most commonly used routes, acting as housing for both laborers and their families. The larger oil companies formalized these sites, building bunk and boarding houses for their workers. The Sunset Railroad, jointly owned by the Southern Pacific and Santa Fe railroad companies, serviced the west side of the oilfields and was greatly responsible for the development of both the McKittrick and Midway-Sunset oilfields. The 1909 extension 7 miles beyond Maricopa, "Siding Two," was created to reach Midway-Sunset Field. The resulting settlement at this siding, originally called "Boost City," later "Moron," and finally "Taft," continues to be the largest community on the west side. Other such settlements have continued on today, originating in towns such as Fellows, Maricopa, McKittrick, and Oildale.

In 1903, the Standard Oil Company completed a 280-mile pipeline from the Kern River oilfield to its Point Richmond refineries on San Francisco Bay. The high viscosity of the oil from the Kern River oilfield required heating at pumping stations along the pipeline so that it flowed easily. Other pipelines connected the region's oilfields to nearby towns like Bakersfield or to railroad stations where it could be loaded into tank cars. In nearly all of the area's oilfields, producers were forced to develop new techniques to remove water or to prevent water from getting into their wells. Because of these advances, production in the Kern County oilfields rose steadily to meet the growing demand, and California became the nation's leading oil producing state in 1903. California produced over 24 million barrels that year, with approximately 70 percent coming from Kern County.

While the largest oil corporation, Standard Oil, was broken up by the U.S. Government in 1911, the vitality of the oil industry was safeguarded by the massive amounts of capital the monopolies had devoted to developing the industry, which experienced standardization in exploration and technology, and business conglomeration and organization. The industry became increasingly important economically due to the parallel development of the automobile and the growing need for gasoline. Though industrial standardization was slow, the history of oil drilling technology and production is particularly important for understanding the archaeology of the oilfields. The majority of the historical material culture in the oilfields comprises remnants of petroleum exploration,

extraction, and movement. Despite the fact that industrial changes were far from uniform or synchronous (even within a single oilfield), the following summary is useful when looking at the oilfields' material cultural record.

Initial drilling technology in the California fields involved the use of so-called cable (or percussion) rigs. These used wooden frame derricks to hoist the drill bit attached to a stem, and subsequently to insert or remove lengths of pipe down-hole. Once the well was drilled, a pump was erected within the derrick structure. Initially these were wooden "walking beam" pumps. Operating the derrick and the pump required an engine or motor of some kind, and a power source. A variety of belts (subsequently chains) and pulley wheels (eventually gears) were also required, along with one or more (wooden) tanks.

Due to earthquake faulting, and the resulting small size of the subterranean petroleum pools, California oilfields developed more densely than oilfields in other parts of the world (where a single well/pump may access a much larger underground reservoir). World War II disrupted the development of oilfield equipment and, following the war, internal combustion engines were used to run the drills and pumps.

Although the rotary drilling rig was introduced in 1908, cable rigs were initially still standard, especially in the California oilfields. Until the development of better rotary drill bits and circulating fluids, older technology was more efficient with difficult down-hole conditions. Initially, rotary rigs continued to be constructed with wooden derricks. Due to the variable down-hole conditions in the California fields, combination rigs, which allowed drillers to switch between cable-percussion and rotary bits and set-ups, were also employed.

Metal derricks, replacing the old wooden structures, were introduced locally in 1924 and allowed more flexibility to local field conditions. Although in theory metal derricks could be placed on the ground surface, most were built on concrete foundations with foundation bolts holding them in place. Derrick size (height and dimensions of base) was a function of well depth, and length of the necessary piping. In general terms, California oilfields required additional and heavier piping, resulting in larger derricks. However, no clear size distinction exists between derricks for cable versus rotary rigs, or wooden as opposed to metal construction.

Although earlier examples exist in other parts of the country, practical use of portable drilling rigs occurred in the region in 1940. This eliminated the need for a foundation, ultimately resulting in a pump jack resting on a small concrete foundation or pad.

The destabilization of the oil market during the period of the Great Depression was alleviated by the onset of World War II, which revived the industry and brought with it bigger, more global markets. The abandonment of Anti-Trust laws by the U.S. Government allowed oil production to increase 30 percent by the end of the war. With the number of vehicles in the United States doubling by 1950, the oil industry was permanently on the rise.

The 1960s began a new era of automation in the oil industry. Automated production machinery required minimal maintenance, and the well-developed regional infrastructure of the southern San Joaquin Valley allowed workers to live in more urban centers such as Bakersfield, eliminating the need for lease towns, which began to decline in population.

The practice of well stimulation by hydraulic fracturing began in the 1940s in California. However, hydraulic fracturing and other forms of well stimulation activity are brief and, once completed, do not result in the installation of surface equipment different from equipment used for wells that have not been stimulated. Therefore, well stimulation and other well stimulation treatment is not associated with historical resources impacts distinct from those of oilfields in general.

Based on the above discussion, and taking into account potential variation, the chronological trends in oilfield technology and their archaeological indicators are as follows:

- Most (but not all) wooden derricks lack concrete foundations and pre-date circa 1924. The archaeological record at these locations typically includes a standing well-pipe, substantial quantities of wire-cut nails and (potentially) milled wood fragments, along with sumps.
- Most steel derrick remnants date between circa 1924 and 1940. These typically include a standing well-pipe, four large concrete derrick foundations arrayed in a square or rectangle, and a series of additional concrete foundations for the pumpjack and motors, set-up in-line with the well-head. Because some set-ups of this type were enclosed in wooden sheds, milled wood fragments and wire-cut nails may also be present, along with sumps and other features.
- Potential cultural resources resulting from portable drilling rigs, post-dating about 1940, primarily consist of a standing well-pipe and flat concrete pad for the pumpjack with minimal other remains. In many cases, it may not be possible to determine whether resources of this type are 70, 50, or even 20 or 10 years old, based on the archaeological record.
- Boilers primarily pre-date World War II. Because they were located a few hundred feet from the pumpjack, for safety purposes, they are expected to be encountered in isolation of other resources.

Existing Cultural Resources

Methods Used to Identify Known Cultural Resources

To identify cultural resources and characterize the project's potential effects on cultural resources, ASM completed a cultural resources study for the project, which included retrieving archival records at the Southern San Joaquin Valley Information Center, California State University, Bakersfield. In addition to the records search and literature review, ASM conducted Native American Tribal consultation. The methodology and results of these efforts are summarized below.

Records Search

An archival records search was conducted at the Southern San Joaquin Valley Information Center, housed at California State University, Bakersfield, in 2020. The searches included a literature review of all known relevant cultural resource surveys, excavation reports, and site records, to ascertain information on potential cultural resources within the project site plus a 1-mile buffer (project study area). Records examined included archaeological site files and maps, the NRHP, Historic Property Data File, California Inventory of Historic Resources, and the California Points of Historic Interest.

The results of the records search indicate that 16 previous cultural resource surveys were performed within the project study area. Five previously recorded cultural resources were documented within the project study area. Additionally, three previous studies were conducted within 0.5 miles of the study area and identified 20 cultural resources within that same radius. The five previously recorded resources within the project study area include the following:

- P-12-0616812 (Historic foundations and refuse)
- P-15-010099 (Prehistoric collected artifacts: shell, lithic, and ground stone scatter)
- P-15-006732 (Prehistoric collected artifacts: shell and lithic)
- P-15-006447 (Prehistoric foundations and refuse)
- P-15-015296 (Historic foundations and a wooden well)

In addition to these five resources, 20 additional resources were previously identified within 0.5 miles of the project study area. The 20 additional resources within 0.5 miles of the study area are identified in Table 4.5-1.

Table 4.5-1: Resources within 0.5 Miles of the Project Study Area

Resource	Type	Description
P-15-003178	Site	Foundations, refuse and wells; Historic
P-15-003179	Site	Refuse scatter; Historic
P-15-006731	Site	Shell and lithic scatter; Prehistoric
P-15-006730	Site	Shell and lithic scatter; Prehistoric
P-15-006729	Site	Shell and lithic scatter; Prehistoric
P-15-003212	Site	Refuse; Historic
P-15-015293	Other	Brick scatter; Historic
P-15-015298	Site	Machinery, wooden wall; Historic
P-15-015413	Site	Foundation and structure; Historic
P-15-003182	Site	Well site; Historic
P-15-003183	Site	Concrete pads; Historic
P-15-003207	Site	Concrete pads; Historic
P-15-003208	Site	Concrete pads, lumber; Historic
P-15-003206	Site	Concrete pads; Historic
P-15-009821	Other	Flaked core; Prehistoric
P-15-006446	Site	Refuse; Historic
P-15-004943	Site	Well and refuse; Historic
P-15-009835	Other	Chert flake; Prehistoric
P-15-015255	Site	Refuse; Historic
P-15-015256	Site	Refuse; Historic

To date, few historical California oil industry sites and no California oil industry landscapes have been determined NRHP eligible/significant by the State Historic Preservation Officer (SHPO) or the Bureau of Land Management despite dozens of evaluations, due to lack of integrity and/or research potential. According to a 1997 SHPO assessment of a landscape nomination for the National Petroleum Reserve #1, oilfield landscapes are unlikely to be determined eligible due to the long history of continued use of the oilfields and these sites' resulting lack of integrity. Major discovery wells or industrial remains that represent significant technological innovations are the only potential sites that might be determined eligible, and these are very rare and already recorded.

ASM revisited the five previously recorded resources for the project study area and performed condition assessments. Below is more detail regarding the five resources.

P-12-0616812: The site was originally recorded by Pacific Legacy, Inc. in 2012 as an oil industry site complex. A total of six features were identified in 2012. Feature 1 consisted of the main building with a basement, machinery mounts on the first floor, and a machinery mount complex to the north; Feature 2 appeared to be a tank storage area; Feature 3 consisted of a partly subsurface trough; Feature 4 was reported to be a foundation with six depressions for vertical tank storage; Feature 5 consisted of a pair of deteriorated concrete pads; and Feature 6 was a foundation with machinery mounts and a subsurface duct. In addition to the features, a sparse historic refuse scatter was also recorded.

During the current study, significant changes to the site were identified. ASM relocated Features 1 and 2 and found both to be heavily deteriorated and partially overgrown with vegetation. The remaining features (Feature 3 through Feature 6) and trash scatter were not relocated, and it is presumed they have been destroyed. The site is in poor condition.

P-15-010099: The site was originally recorded as an isolated modified quartzite boulder by Osborne in 1990. In 2001, Pacific Legacy, Inc. updated the resource to a site. The site was last described as a temporary camp comprised of freshwater shell, three Olivella shells, sparse lithics, fire-affected rock, and the modified quartzite boulder (presumed mortar) originally recorded by Osborne.

ASM attempted unsuccessfully to relocate the site. No evidence of the site could be identified, and it is presumed the site has been destroyed.

P-15-006732: The site was originally recorded by Pacific Legacy, Inc. in 1997 as a sparse scatter of freshwater mussel shell and chert debitage. The site is only partially located within the northwest plume area and only that portion of the site was revisited. The site was successfully relocated and remains as last described with no noticeable disturbances within the investigation portion of the site. Only a light scatter of freshwater shell was observed within the investigated portion of the site and no lithics were identified.

P-15-006447: The site was originally recorded by Pacific Legacy, Inc. in 1998 and later updated in 2012. In 2012 all features recorded as portions of the Hay-Carmen Camp site were relocated, as well as all features that were included in the 1998 sketch map. Changes to the site have occurred since the initial recordation.

During the current study, Feature 1 (partially deteriorated foundation) and Feature 2 (the corral) were successfully relocated. Both features were partially deteriorated and overgrown with vegetation. Refuse scatter "A" was noted on a slope and eroding down the hillside. Refuse scatter "B" could not be relocated. Refuse scatter "C" was relocated on a southwest facing slope within the site. The site appears to be in poor condition.

P-15-015296: The site was originally recorded by Pacific Legacy, Inc. in 2009 and was reported to consist of cement foundations and a wooden well. The site was successfully relocated. In addition to the cement foundations, a light scatter of wooden debris and bricks were noted scattered down an adjacent hillside. The site remains as last described with no noticeable disturbances.

Native American Consultation

In addition to the records search, ASM contacted the Native American Heritage Commission (NAHC) to obtain a Native American Tribal contact list. Outreach letters were sent to tribal organizations on the NAHC contact list on December 23, 2023, and follow-up emails were sent on February 28, 2023. The results of tribal outreach are presented in Table 4.5-2.

Table 4.5-2: Summary of Tribal Coordination

Native American Tribe	Correspondence Attempts	Response
Big Pine Paiute Tribe of the Owens Valley	Mailer: 12/23/2022 Email: 02/28/2023	No response
Chumash Council of Bakerfield	Mailer: 12/23/2022 Email: 02/28/2023	No response
Coastal Band of the Chumash Nation	Mailer: 12/23/2022 Email: 02/28/2023	No response
Kitanemuk & Yowlumne Tejon	Mailer: 12/23/2022 Email: 02/28/2023	No response
Salinan Tribe of Monterey, San Luis Obispo Counties	Mailer: 12/23/2022 Email: 02/28/2023	No response
Santa Ynez Band of Chumash Indians	Mailer: 12/23/2022 Email: 02/28/2023	"Thank you for contacting the Tribal Elders' Council for the Santa Ynez Band of Chumash Indians. We acknowledge that the project may impact cultural resources and hope that you are consulting with local tribes. At this time, the Elders' Council requests no further consultation on this project; however, we understand that as part of

Table 4.5-2: Summary of Tribal Coordination

Native American Tribe	Correspondence Attempts	Response
		NHPA Section 106, we must be notified of the project. Thank you for remembering that at one time our ancestors walked this sacred land."
Tejon Indian Tribe	Mailer: 12/23/2022 Email: 02/28/2023	No response
Tule River Indian Tribe	Mailer: 12/23/2022 Email: 02/28/2023	"Thank you for your letter dated 12/23/22 regarding the Carbon Terra Vault I Project in Elk Hills, Kern County CA. At this time, we do not have any specific information regarding culturally important items or sites within the proposed project are. We would, however, like to continue consultation with you regarding this project at this time, and are interested in results from any cultural assessments that are conducted. We also may be interested in making a site visit, if warranted, since resources were found. This can be determined in the future."
Yak tityu tityu yak tilhini – Northern Chumash	Mailer: 12/23/2022 Email: 02/28/2023	"Thank you for reaching out to our Tribe. We have no comments on this project at this time. We defer to the Tejon Tribe."

The records searches, supplemental research and consultation did not reveal any known cemeteries or burial sites within the project study area. No Native American sacred sites or human burials are known to be located within the project site boundaries.

4.5.3 Regulatory Setting

Federal

National Historic Preservation Act of 1966

Enacted in 1966, the National Historic Preservation Act (NHPA) declared a national policy of historic preservation and instituted a multifaceted program, administered by the Secretary of the Interior to encourage the achievement of preservation goals at the federal, state, and local levels. The NHPA authorized the expansion and maintenance of the NRHP, established the position of SHPO and provided for the designation of State Review Boards, set up a mechanism to certify local governments to carry out the purposes of the NHPA, assisted Native American tribes to preserve their cultural heritage, and created the Advisory Council on Historic Preservation (ACHP). Section 106 of the NHPA states that federal agencies with direct or indirect jurisdiction over federally funded, assisted, or licensed undertakings must take into account the effect of the undertaking on any historic property that is included in, or eligible for inclusion in, the NRHP and that the ACHP must be afforded an opportunity to comment, through a process outlined in the ACHP regulations at 36 Code of Federal Regulations (CFR) Part 800, on such undertakings.

National Register of Historic Places

As presented in 36 CFR 60.2, the NRHP was established by the NHPA of 1966 as "an authoritative guide to be used by federal, state, and local governments, private groups, and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment." The NRHP recognizes properties that are significant at the national, state, and local levels. To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. A property is eligible for the NRHP if it is significant under one or more of the following criteria:

- **Criterion A:** It is associated with events that have made a significant contribution to the broad patterns of our history.
- **Criterion B:** It is associated with the lives of persons who are significant in our past.
- **Criterion C:** It embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction.
- **Criterion D:** It has yielded, or may be likely to yield, information important in prehistory or history.

Cemeteries, birthplaces, or graves of historic figures; properties owned by religious institutions or used for religious purposes; structures that have been moved from their original locations; reconstructed historic buildings; and properties that are primarily commemorative in nature are not considered eligible for the NRHP unless they satisfy certain conditions. In general, a resource must be at least 50 years of age to be considered for the NRHP, unless it satisfies a standard of exceptional importance.

State

California Environmental Quality Act

CEQA requires the assessment of a proposed project's effects on cultural resources. Pursuant to CEQA, a "historical resource" is a resource listed in, or eligible for listing in, the CRHR. In addition, resources included in a local register of historic resources or identified as significant in a local survey conducted in accordance with State guidelines are also considered historic resources under CEQA, unless a preponderance of the facts demonstrates otherwise. Properties listed in or formally determined eligible for listing in the MRHP are automatically included in the CRHR. According to CEQA, the fact that a resource is not listed in or determined eligible for listing in the CRHR or is not included in a local register or survey shall not preclude a lead agency, as defined by CEQA, from determining that the resource may be a historical resource as defined in California PRC Section 5024.1. CEQA applies to archaeological resources when (1) the archaeological resource satisfies the definition of a historical resource, or (2) the archaeological resource satisfies

the definition of a "unique archaeological resource." A unique archaeological resource is an archaeological artifact, object, or site that has a high probability of meeting any of the following criteria:

- The archaeological resource contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- The archaeological resource has a special and particular quality such as being the oldest of its type or the best available example of its type.
- The archaeological resource is directly associated with a scientifically recognized important prehistoric or historic event or person.

California Register of Historical Resources

Under the California PRC, Section 5024.19(a), the CRHR was created in 1992 and implemented in 1998 as "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." Certain properties, including those listed in or formally determined eligible for listing in the NRHP and California Historical Landmarks numbered 770 and higher, are automatically included in the CRHR. Other properties recognized under the California Points of Historical Interest program, identified as significant in historical resources surveys or designated by local landmarks programs, may be nominated for inclusion in the CRHR. A resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission (SHRC) determines that it meets one or more of the following criteria, which are modeled on NRHP criteria:

- **Criterion 1.** It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- **Criterion 2.** It is associated with the lives of persons important in our past.
- **Criterion 3.** It embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values.
- **Criterion 4.** It has yielded, or may be likely to yield, information important in history or prehistory.

Furthermore, under PRC Section 4852(c), a cultural resource must retain integrity to be considered eligible for the CRHR. Specifically, it must retain sufficient character or appearance to be recognizable as a historical resource and convey reasons of significance. Integrity is evaluated with regard to retention of such factors as location, design, setting, materials, workmanship, feeling, and association. Cultural sites that have been affected by ground-disturbing activities, such as grazing and off-road vehicle use (both of which occur within the project site), often lack integrity because they have been directly damaged or removed from their original location, among other changes.

Typically, a prehistoric archaeological site in California is recommended eligible for listing in the CRHR based on its potential to yield information important in prehistory or history (Criterion 4). Important information includes chronological markers such as projectile point styles or obsidian artifacts that can be subjected to dating methods or undisturbed deposits that retain their stratigraphic integrity. Sites such as these have the ability to address research questions.

California Historical Landmarks

California Historical Landmarks (CHLs) are buildings, structures, sites, or places that have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value and that have been determined to have statewide historical significance by meeting at least one of the criteria listed below. The resource also must be approved for designation by the County Board of Supervisors (or the city or town council in whose jurisdiction it is located); be recommended by the SHRC; and be officially designated by the Director of California State Parks. The specific standards now in use were first applied in the designation of CHL #770. CHLs #770 and above are automatically listed in the CRHR.

To be eligible for designation as a landmark, a resource must meet at least one of the following criteria:

- It is the first, last, only, or most significant of its type in the State or within a large geographic region (Northern, Central, or Southern California);
- It is associated with an individual or group having a profound influence on the history of California; or
- It is a prototype of, or an outstanding example of, a period, style, architectural movement or construction or is one of the more notable works or the best surviving work in a region of a pioneer architect, designer, or master builder.

California Points of Historical Interest

California Points of Historical Interest are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Points of historical interest designated after December 1997 and recommended by the SHRC are also listed in the CRHR. No historic resource may be designated as both a landmark and a point. If a point is later granted status as a landmark, the point designation will be retired. In practice, the point designation program is most often used in localities that do not have a locally enacted cultural heritage or preservation ordinance.

To be eligible for designation as a point of historical interest, a resource must meet at least one of the following criteria:

- It is the first, last, only, or most significant of its type within the local geographic region (city or county);
- It is associated with an individual or group having a profound influence on the history of the local area; or
- It is a prototype of, or an outstanding example of, a period, style, architectural movement or construction or is one of the more notable works or the best surviving work in the local region of a pioneer architect, designer, or master builder.

Native American Heritage Commission

Section 5097.91 of the California PRC established the NAHC, whose duties include the inventory of places of religious or social significance to Native Americans and the identification of known graves and cemeteries of Native Americans on private lands. Section 5097.98 of the PRC specifies a protocol to be followed when the NAHC receives notification of a discovery of Native American human remains from a county coroner.

California Public Records Act

Sections 6254(r) and 6254.10 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 maintained by the Native American Heritage Commission." Section 6254.10 specifically exempts from disclosure requests for "records that relate to archaeological site information and reports, maintained by, or in the possession of the Department of Parks and Recreation, the SHRC, the State Lands Commission, the NAHC, 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."

Health and Safety Code, Sections 7050 and 7052

Health and Safety Code, Section 7050.5, declares that, in the event of the discovery of human remains outside of a dedicated cemetery, all ground disturbance must cease, and the county coroner must be notified. Section 7052 establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives.

California Penal Code, Section 622.5

The California Penal Code, Section 622.5, provides misdemeanor penalties for injuring or destroying objects of historic or archaeological interest located on public or private lands, but specifically excludes the landowner.

Public Resources Code, Section 5097.5

PRC, Section 5097.5, defines as a misdemeanor the unauthorized disturbance or removal of archaeological, historic, or paleontological resources located on public lands.

Local

Kern County General Plan

The project site is located within the Kern County General Plan (KCGP) and would therefore be subject to applicable policies and measures of the KCGP. The Land Use, Open Space, and Conservation Element of the KCGP include the following policies and implementation measures related to cultural resources that would apply to the project:

Chapter 1. Land Use, Open Space, and Conservation Element

1.10.3. – Archaeological, Paleontological, Cultural, and Historical Preservation

Policy

Policy 25. The County will promote the preservation of cultural and historic resources that provide ties with the past and constitute a heritage value to residents and visitors.

Implementation Measures

Implementation Measure K. Coordinate with the California State University, Bakersfield's Archaeology Inventory Center.

Implementation Measure L. The County shall address archaeological and historical resources for discretionary projects in accordance with CEQA.

Implementation Measure 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.

Implementation Measure 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.

4.5.4 Impacts and Mitigation Measures

Methodology

This analysis is based on CTV I Cultural Resources Technical Review Letter prepared by ASM, in April 2023. To evaluate the project's potential effects on significant cultural resources, including prehistoric and historic archaeological sites, ASM evaluated the project site, which included a

literature review, Native American consultation, and a pedestrian survey for the previously recorded cultural resources within the project study area. Using these resources and professional judgment, impacts were analyzed according to CEQA significance criteria described below.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist state that a project would normally be considered to have a significant impact if it would:

- Cause a substantial adverse change in the significance of a historical or archaeological resource pursuant to CEQA Guidelines Section 15064.5; or
- Disturb any human remains, including those interred outside of formal cemeteries.

Section 21083.2(g) of CEQA further defines "unique archaeological resource" for purposes of determination as to whether a project may have a significant effect on archaeological resources. As used in this section "unique archaeological resource" means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

According to CEQA Guidelines, California Code of Regulations (CCR) Title 14, 15064.5, a project with an effect 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 (CCR Title 14, 15064.5(b)). The guidelines further state that a substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historic resource would be materially impaired. Actions that would materially impair the significance of a historical resource are any actions that would demolish or adversely alter those physical characteristics of a historical resource that convey its historical significance and qualify it for inclusion in the CRHR or in a local register or survey that meet the requirements of PRC Sections 5020.1(k) and 5024.1(g).

Project Impacts

Impact 4.5-1: Cause a Substantial Adverse Change in the Significance of a Historical Resource as Defined in Section 15064.5

The records search indicated the project study area was entirely surveyed as a result of 16 previous surveys. Two of the five previously recorded resources are of historic-era (P-12-061812 and P-15-0152996), and one is a multicomponent prehistoric/historic-era (P-15-006447). No new historical resources were identified. No ground-disturbing activities are anticipated at or in close proximity to the recorded locations of the sites. However, if historic sites are impacted, this would constitute a significant impact to a historical resource. MM 4.5-1 would require cultural resources surveys, preservation of resources, and sensitivity training for construction workers. Potential impacts to historic resources that could qualify as significant historical resources, would be mitigated to less than significant through the implementation of MM 4.5-1.

Mitigation Measures

MM 4.5-1 The following are requirements for any and all grading and construction activities on all project components with defined ground disturbance, including all injection wells, abandonment of wells, capture facilities and pipelines. The remaining CCS Surface Land Area that is within the project boundary but has no construction or disturbance is not subject to this requirement.

a. The Owner/operator shall demonstrate whether the project site has been previously surveyed for cultural resources. The Owner/operator may rely on a previously performed ground surface survey for subsequent ground disturbing activities. If the project site has not been previously surveyed based on the records search information, an intensive (100%) pedestrian ground-surface survey (Phase I survey/Class III inventory) by qualified archaeologists shall be required. If no cultural resources have been recorded, then no further cultural resources studies shall be required.

b. All prehistoric/Native American archaeological sites, whether identified during the records searches or during the intensive survey, shall be demarcated by a qualified archaeologist, fenced by the Owner/operator, and preserved in place.

c. Should it be determined that preservation in place is not achievable, then historical (Euro-American) archaeological sites that are potentially eligible for listing in the National Register of Historic Places (NRHP) and/or California Register of Historic Resources (CRHR) shall be evaluated by a qualified archaeologist or historian and must meet the requirements of the National Historic Preservation Act of 1966 and/or California PRC 5024.1; 14 CCR Section 15064.5[a][3] in order to qualify.

   Qualifying sites, structures and equipment that are identified during the records search or field survey shall be fenced and preserved in open space,

removed and curated, or treated using data recovery procedures that follow the guidelines of the Secretary of the Interiors Standards for Architectural and Engineering Documentation.

d. Historical (Euro-American) archaeological site types relating to oil and gas activities that have been determined Not Significant/Unique shall require no archaeological study or treatment.

e. All employees conducting work in the area identified on the CCS final design plans shall complete Worker Environmental Awareness Program training including training dedicated to cultural resources protection.

f. Qualified Native American Tribal monitors shall be retained from a Kern County Federally recognized tribe for all construction activities. The Tribe may elect to delegate this employment to other Tribes in the area. All monitors must have completed safety training for oilfield worker as well as the Worker Awareness Program. Written documentation from the Tribe on the monitors and completed training shall be provided to the Kern County Planning and Natural Resources Department.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.5-2: Cause a Substantial Adverse Change in the Significance of an Archeological Resource as Defined in Section 15064.5

Two of the five previously recorded resources were identified as pre-historic (P-15-010099 and P-15-006732), and one is a multicomponent prehistoric/historic-era resource (P-15-006447). No new archaeological resources have been identified. Since the project does not involve ground-disturbing activities near the resources, no impact would occur. However, during construction, grading and excavation activities have the potential to unearth previously undiscovered, intact archaeological materials. If such materials, including human remains, are found, a potentially significant impact may occur. Therefore, MM 4.5-1 and MM 4.5-2 would be implemented to address potential impacts to archaeological resources during construction.

Mitigation Measures

In addition to MM 4.5-1 previously identified, MM 4.5-2 would be incorporated.

MM 4.5-2 In the event archaeological materials are encountered during the course of ground disturbance or construction, the project operator/contractor shall cease any ground disturbing activities within 500 feet of the find or as needed to preserve the site. The qualified archaeologist shall evaluate the significance of the resources and recommend treatment measures. Per California Environmental Quality Act Guidelines Section 15126.4(b)(3), project redesign and preservation in place shall be the preferred means to avoid impacts to significant historical resources.

Consistent with California Environmental Quality Act Guidelines Section 15126.4(b)(3)(C), if it is demonstrated that resources cannot be avoided, the qualified archaeologist shall develop additional treatment measures in consultation with the County, which may include data recovery or other measures. The Planning and Natural Resources Department shall consult with Native American representatives in determining treatment for unearthed cultural resources if the resources are prehistoric or Native American in nature. If after consultation it is determined that archaeological materials are to be recovered, then they shall be curated at an accredited curation facility. The qualified archaeologist shall prepare a report documenting evaluation and/or additional treatment of the resource. A copy of the report shall be provided to the Kern County Planning and Natural Resources Department and to the Southern San Joaquin Valley Information Center.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.5-3: Disturb any Human Remains, including those Interred outside of Formal Cemeteries

Buried human remains that were not identified during field surveys could be inadvertently unearthed during excavation activities, which could damage these human remains, and could result in a significant impact. Therefore, MM 4.5-3 contains procedures for recording and treating any human remains that are discovered during construction of the project. MM 4.5-3 requires that these items be protected, preserved and treated in accordance with applicable laws, regulations and guidelines.

Mitigation Measures

MM 4.5-3 If human remains are uncovered during project construction, the Owner/operator shall immediately halt all work on the site, contact the Kern County Coroner to evaluate the remains, and follow the procedures and protocols set forth in Section 15064.5 (e)(1) of the California Environmental Quality Act Guidelines. The Kern County Planning and Natural Resources Department shall be notified concurrently. If the County Coroner determines that the remains are Native American, the project proponent shall contact the Native American Heritage Commission, in accordance with Health and Safety Code Section 7050.5, subdivision (c), and Public Resources Code 5097.98 (as amended by Assembly Bill 2641). The Native American Heritage Commission shall designate a Most Likely Descendant for the remains per Public Resources Code 5097.98. Per Public Resources Code 5097.98, the Owner/operator , in coordination with the landowner, shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the discussion and

conference with the Most Likely Descendant has occurred, if applicable, taking into account the possibility of multiple human remains. If the remains are determined to be neither of forensic value to the Coroner, nor of Native American origin, provisions of the California Health and Safety Code (7100 et. seq.) directing identification of the next-of-kin will apply. In the event human remains are uncovered, the surface owner shall be notified immediately.

Level of Significance after Mitigation

Impacts would be less than significant.

4.5.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development, including wells and abandonment activity to implement carbon capture and storage projects, constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; an SREIR certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The aforementioned documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate Bill [SB] 4 Activities, plugged and abandoned) per year (Page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to cultural resources is considered the Elk Hill Oilfield. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on cultural resources. This geographic scope of analysis is appropriate because the archaeological, historical, and paleontological resources within this area are expected to be similar to those in the project site because of their proximity; similar environments, landforms, and hydrology would result in similar land-use—and thus, site types.

Impact 4.5-4: Contribute to Cumulative Cultural Resources Impacts

With regard to impacts to significant cultural resources, the project has the potential to contribute significantly to cumulative impacts within the region. A complete analysis of the cumulative impacts of the various ground disturbing activities from oil and gas are provided in Section 4.5, *Cultural and Paleontological Resources* of the Kern County Oil and Gas EIR. Through implementation of MM 4.5-1 through MM 4.5-3, impacts to known archaeological sites would be avoided entirely, if feasible. If a significant archaeological resource cannot be avoided, MM 4.5-1 would ensure that significant impacts are reduced by testing or data recovery.

There is potential for unanticipated and previously unidentified cultural resources, and if discovered, the project would implement MM 4.5-1 and MM 4.5-3 to monitor construction and treat newly discovered sites, thus reducing the project impacts. In addition, the other projects identified in Section 3.9, *Cumulative Projects*, would also be expected to have Mitigation Measures that would reduce potential impacts on archeological resources. Federally licensed projects require compliance with Section 106 of the NHPA to consider and resolve adverse effects to significant cultural resources. Likewise, compliance with CEQA for all projects would be expected to reduce impacts on archaeological resources; however, because archaeological resources are non-renewable and each resource contributes important information about prehistory, mitigative data recovery in itself can be destructive. Although a portion of an archaeological resources site can be salvaged, which may reduce impacts, those impacts to that resource would remain significant. Implementation of MM 4.5-1 would reduce significant impacts to archaeological resources but uncertainty remains.

Regarding the potential to disturb human remains, the project could contribute significantly to cumulative impacts within the region. Although no human remains have been identified within the project site, to date, there is potential for their discovery during project construction. If human remains were to be discovered during construction, MM 4.5-1 would ensure that the remains are treated in accordance with the California PRC and would not represent a significant unmitigable impact. The potential impacts of the other projects identified in Section 3.9, *Cumulative Projects*, would also be expected to be reduced by compliance with the Public Resources Codes.

Implementation of best professional practices would reduce many impacts to a less than significant level. However, given the depths needed for the Underground Injection Control Class IV injection wells the potential for destruction of unknown cultural resources is possible. Given the size and scope of oil and gas activities in the unincorporated area, and the impacts of this project at depths

where cultural resources cannot be assessed cumulative impacts to cultural resources are significant and unavoidable with all feasible and reasonable mitigation for MM 4.5-1 through MM 4.5-3.

Mitigation Measures

Implement MM 4.5-1 through MM 4.5-3.

Level of Significance after Mitigation

Cumulative impacts would be significant and unavoidable.

Section 4.6

Energy

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Section 4.6
Energy

4.6.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting regarding energy. It also evaluates existing energy conditions in the project area and analyzes the impacts on energy levels that would result from implementation of the California Resources Corporation's (project proponent) proposed Carbon TerraVault I (Kern County)Project (project) and identifies mitigation measures that would reduce these impacts, if necessary. The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the city of Taft and approximately 4 miles from the unincorporated community of Buttonwillow.

The purpose of this section is to discuss the potential energy use associated with construction and operation of the project. Information contained within this section was provided by the Air Quality Impact Analysis, dated May 2023, which was prepared by Trinity Consultants and is included as Appendix B-1 of this EIR.

A description of the environmental setting (affected environment) for energy is presented below in Section 4.6.2, *Environmental Setting*. The regulatory setting applicable to energy-related impacts are presented in Section 4.6.3, *Regulatory Setting*, and Section 4.6.4, *Impacts and Mitigation Measures,* discusses project impacts and associated mitigation measures.

4.6.2 Environmental Setting

Pacific Gas and Electric (PG&E) provides natural gas and electric service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California, including Kern County (County) (PG&E 2023). In February 2018, PG&E announced that it had reached California's 2020 renewable energy goal three years ahead of schedule (CCEC 2022). In 2021, approximately 48 percent of PG&E's electricity came from renewable resources including solar, wind, geothermal, biomass, and small hydroelectric sources. Additionally, approximately 91 percent of PG&E's total electric power mix is from greenhouse gas (GHG) free sources, which includes nuclear and large hydroelectric sources of energy (CEC 2023).

The California Energy Commission (CEC) tracks electricity and natural gas consumption across the State of California (State) for residential and nonresidential sources. In 2021, the County used a total of 15,009 gigawatt hours of electricity and 1,866 million of therms of natural gas. Approximately 82 percent of the electricity usage and 95 percent of the natural gas use in the County came from nonresidential sources (CEC 2016a,2016b).

The project area is currently an active oilfield, with 344 wells being managed at Elk Hills. Of these wells, 143 are active, 125 are idle, and 76 are abandoned. Existing on-site facilities are described in Section 3.3, *Environmental Setting*.

4.6.3 Regulatory Setting

Federal

Federal Vehicle Standards

Energy Policy and Conservation Act (1975)

The Energy Policy and Conservation Act of 1975 (EPCA) mandated that the National Highway Traffic Safety Administration (NHTSA) establish and implement a regulatory program for motor vehicle fuel economy, known as the Corporate Average Fuel Economy (CAFE) program, to reduce national energy consumption. As codified in Chapter 329 of Title 49 of the United States Code, as amended by the Energy Independence and Security Act (EISA), the EPCA sets forth specific requirements concerning the establishment of average fuel economy standards for passenger cars and light trucks. The EISA, discussed above, amended the EPCA CAFE program requirements by providing the U.S. Department of Transportation additional rulemaking authority and responsibilities.

Consistent with its statutory authority in rulemaking to establish CAFE standards for model year 2017 and beyond, NHTSA developed two phases of standards. The first phase included final standards for model years 2017–2021. The second phase, covering model years 2022–2025, included standards that were not final, because of the statutory requirement that NHTSA set average fuel economy standards not more than five model years at a time. Rather, NHTSA wrote that those standards were augural, meaning that they represented its best estimate, based on the information available at that time, of what levels of stringency might be maximum feasible in those model years. In 2012, the agencies jointly adopted more stringent Phase 2 standards for light duty cars and trucks, which would cover model years 2017 through 2025. In August of 2016, the agencies adopted more stringent Phase 2 standards for medium- and heavy-duty vehicles, which would cover model years 2018 through 2027 for certain trailers and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks.

On March 31, 2020, the NHTSA and U.S. Environmental Protection Agency (EPA) released a new rule, the final Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule, setting CAFE and carbon dioxide (CO_2) emissions standards for model years 2021 through 2026 for passenger cars and light trucks. The rule rolls back the 2012 standards for model years 2021 through 2026 for passenger cars and light trucks, which had required an average fleetwide fuel economy equivalent of 54.5 miles per gallon in model year 2025 with a 5 percent annual increase to an average fuel economy of about 40 miles per gallon in model year 2025 with annual increases of 1.5 percent starting in 2021. As a part of issuing the new SAFE rule, the NHTSA issued a Final Environmental Impact Statement, which found that the relaxed standards would result in increased petroleum consumption that, in turn, would result in increases in GHG and criteria pollutant emissions known to contribute

to adverse health impacts (NHTSA 2020). The estimated increases from the roll back of the 2012 standards are expected to result in more than 1 billion metric tons of additional climate pollution through 2040, as determined by calculating the difference from the reduction of the 2 billion metric tons that the 2012 rule was expected to accomplish compared to the standards of the 2020 rule (NHTSA 2020).

On January 20, 2021, Executive Order 13990 was issued on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, which includes review of the Part One Rule by April 2021 and review of the Part Two Rule by July 2021. In response to the Part One Rule, in December 2021, the U.S. Department of Transportation withdrew its portions of the SAFE rule. As a result, states are now allowed to issue their own GHG emissions standards and zero-emissions vehicle mandates. In addition, the Part Two Rule was adopted to revise the existing national GHG emission standards for passenger cars and light trucks through model year 2026. These standards are the strongest vehicle emissions standards ever established for the light-duty vehicle sector and will result in avoiding more than three billion tons of GHG emissions through 2050.

National Energy Conservation Policy Act (1978)

The National Energy Conservation Policy Act of 1978 (42 §8201 et seq.) is the foundation of most federal energy requirements. The National Energy Conservation Policy Act also established fuel economy standards for on-road motor vehicles in the United States. The NHTSA is responsible for establishing additional vehicle standards and for revising existing standards. The NHTSA and EPA are taking coordinated steps to enable the production of clean energy vehicles with improved fuel efficiency. NHTSA sets the CAFE levels, which are rapidly increasing over the next several years to improve energy security and reduce fuel consumption. In March 2022, the NHTSA finalized CAFE standards for model years 2024 to 2026. The standards require an industry-wide fleet average of approximately 49 miles per gallon for passenger cars and light trucks by model year 2026. The NHTSA projects that these standards will prevent the consumption of approximately 234 billion gallons of gasoline between model years 2030 and 2050 (NHTSA 2022).

Energy Independence and Security Act of 2007

The EISA aimed to increase U.S. energy security, increased CAFE standards for motor vehicles, and included provisions related to energy efficiency, such as renewable fuel standards (RFS), appliance and lighting efficiency standards, and building energy efficiency standards. The EISA required increasing levels of renewable fuels to replace petroleum. The EPA is responsible for developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel.

The RFS program regulations were developed in collaboration with refiners, renewable fuel products, and other stakeholders and were created under the Energy Policy Act of 2005. The RFS program established the first renewable fuel volume mandate in the United States. As required under the EISA, the original RFS program required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012. The RFS program was expanded in several ways that laid the foundation for achieving significant reductions of GHG emissions through the use of renewable

fuels, reducing imported petroleum, and encouraging the development and expansion of the nation's renewable fuels sector. The updated program is referred to as RFS2 and includes the following:

- The EISA expanded the RFS program to include diesel, in addition to gasoline.
- The EISA increased the volume of renewable fuel required to be blended into transportation fuel from 9 billion gallons in 2008 to 36 billion gallons by 2022.
- The EISA established new categories of renewable fuel and set separate volume requirements for each one.
- The EISA required the EPA to apply lifecycle GHG performance threshold standards to ensure that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces.

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternate energy, additional research in carbon capture, international energy programs, and creation of "green jobs."

Inflation Reduction Act of 2022

The Inflation Reduction Act (IRA) of 2022 is considered the most ambitious climate law in U.S. history and is intended to reduce GHG emissions, help build a clean economy, reduce energy costs for Americans, and advance environmental justice. With funding from the IRA, the EPA has launched a network of clean energy financing and provided grant funding for climate pollution reduction programs (EPA 2023). The IRA increases the 45Q tax credit to $85 per ton for geologic sequestration of CO_2 from industrial sources.

State

California Energy Code

Compliance with the California Energy Code (Title 24, Part 6, California's Energy Efficiency Standards) and Title 20, Public Utilities and Energy, standards must occur for all new buildings constructed in California. These efficiency standards apply to new construction of both residential and nonresidential (i.e., maintenance buildings and pump station buildings associated with the project), and they regulate energy consumed for heating, cooling, ventilation, water heating, and lighting. The building efficiency standards are enforced through the local building permit processes, and local government agencies may adopt and enforce energy standards for new buildings, provided that these standards meet or exceed those provided in the Title 24 guidelines.

Warren-Alquist Energy Resources Conservation and Development Act

Initially passed in 1974 and amended since, the Warren-Alquist Energy Resources Conservation and Development Act (Warren-Alquist Act) created the CEC, California's primary energy and planning agency. The seven responsibilities of the CEC are (1) forecasting future energy needs, (2) promoting energy efficiency and conservation through setting standards, (3) supporting energy-

related research, (4) developing renewable energy resources, (5) advancing alternative and renewable transportation fuels and technologies, (6) certifying thermal power plants 50 megawatts (MW) or larger, and (7) planning for and directing State response to energy emergencies. The CEC regulates energy resources by encouraging and coordinating research into energy supply and demand problems to reduce the rate of growth of energy consumption. Additionally, the Warren-Alquist Act acknowledges the need for renewable energy resources and encourages the CEC to explore renewable energy options that would be in line with environmental and public safety goals (Public Resources Code [PRC] Section 25000 et seq.)

California Integrated Energy Policy

Senate Bill (SB) 1389 requires the CEC to "conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The Energy Commission shall use these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety" (PRC Section 25301(a)). The CEC adopts an Integrated Energy Policy Report every two years and an update every other year. The most recent version is the 2022 Integrated Energy Policy Report Update (CEC 2022).

California Renewables Portfolio Standard

California's Renewables Portfolio Standard (RPS) was initially established in 2002 by SB 1078, with the initial requirement that 20 percent of electricity retail sales be served by renewable resources by 2017. The program was accelerated in 2006 under SB 107, which required that the 20 percent mandate be met by 2010. In April 2011, SB 2 was signed into law, requiring electricity retailers in the State to procure 33 percent of their energy sources from renewable energy sources by the end of 2020 (CPUC 2021). In addition, SB 350, passed in 2015, directs California utilities to further increase the amount of renewable energy delivered to customers to 50 percent by 2030.

The California Public Utilities Commission implements and administers RPS compliance rules for California's retail sellers of electricity, which include large and small investor-owned utilities, publicly owned utilities, electric service providers, and community choice aggregators. The CEC is responsible for the certification of electrical generation facilities as eligible renewable energy resources and adopting regulations for the enforcement of RPS procurement requirements of publicly owned utilities.

Low Carbon Fuel Standard

In 2007, Executive Order S-01-07 established the Low Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the CEC, the California Air Resources Board (CARB), the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. CARB adopted the LCFS on April 23, 2009.

The LCFS was subject to legal challenge in 2011. Ultimately, CARB was required to bring a new LCFS regulation for consideration in February 2015. The proposed LCFS regulation was required to contain revisions to the 2010 LCFS and new provisions designed to foster investments in the production of the low-carbon fuels, offer additional flexibility to regulated parties, update critical technical information, simplify and streamline program operations, and enhance enforcement. The regulation was last amended in 2018. The 2018 amendments strengthen the carbon intensive fuel reduction targets beyond 2020 to support the climate goals established in SB 32. Other major changes to the 2018 amendments include expanding the fuel types and eligible activities to participate in the LCFS (CARB 2018a). One of the specific regulations added in 2018 is the Carbon Capture and Sequestration Protocol under the LCFS (CARB 2018b). The Carbon Capture and Sequestration Protocol establishes methodology for quantifying geological CO_2 sequestration, as well as permanence requirements related to site characteristics, plume extent evaluation, testing and monitoring, well operation, post-injection site care, and more.

2022 Scoping Plan for Achieving Carbon Neutrality

The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) was approved by CARB in December 2022 and assesses progress toward achieving the State's GHG reduction goals and establishes a path to achieve carbon neutrality no later than 2045. The 2022 Scoping Plan focuses on outcomes needed to achieve carbon neutrality by assessing paths for advancing transportation technology, clean energy deployment, maintenance and preservation of natural and working lands, and others, and is designed to meet the State's long-term climate objectives. Specifically, the 2022 Scoping Plan identifies carbon negative technologies, including nature-based and mechanical carbon sequestration projects, as an essential component in achieving state-wide carbon neutrality (CARB 2022).

Local

Kern County General Plan

The project area is located within the Kern County General Plan (KCGP) area and, therefore, would be subject to applicable policies and measures of the KCGP. The Energy Element of the KCGP include goals, policies, and implementation measures related to energy that apply to the project, as described below.

Chapter 5. Energy Element

5.2 Importance of Energy to Kern County

Goal. To assert Kern County's position as California's leading energy producer, to encourage safe and orderly energy development within the County, including research and demonstration projects, and to become actively involved in the decisions and actions of other agencies as they affect energy development in Kern County.

Policies

Policy 1. Kern County should assert and promote its role as the State's leading energy County.

Policy 4. The County should actively seek State and federal energy grants and projects to assist in energy planning and development.

Policy 5. The County shall work with other agencies to define regulatory responsibility concerning energy-related issues, and shall seek to eliminate, insofar as possible, duplicative regulations.

Policy 6. The County should encourage discussion and mutual cooperation of various energy industries within the County to establish mutual understanding of common needs and issues.

Policy 7. The processing of all discretionary energy project proposals shall comply with California Environmental Quality Act (CEQA) Guidelines directing that the environmental effects of a project must be taken into account as part of project consideration.

Policy 8. The County should work closely with local, State, and federal agencies to assure that energy projects (both discretionary and ministerial) avoid or minimize direct impacts to fish, wildlife, and botanical resources, wherever practical.

Policy 9. The County should develop and implement measures which result in long-term compensation for wildlife habitat, which is unavoidably damaged by energy exploration and development activities.

5.3.2 Kern County's Economic Dependence on the Oil Market

Goal. To reduce the County's susceptibility to fluctuations in the petroleum production levels, and to encourage diversification of the economy.

Policies

Policy 3. The County shall encourage the conversion of existing petroleum-related facilities to other productive uses when they are no longer needed or productive.

5.3.5 Reuse of Nonproductive Petroleum Resource Areas

Goal. To ensure the proper abandonment of petroleum production operations, in accordance with DOGGR requirements, when petroleum resource areas are depleted or are no longer productive, to provide for conversion of these areas to other land uses.

Policies

Policy 1. The County shall promote safe well abandonment in accordance with DOGGR regulations through discretionary applications.

Policy 2. The County shall work with the DOGGR to ensure the removal of all surface equipment from abandoned petroleum development sites.

Policy 3. The County shall promote and encourage the safe reuse of former petroleum production lands by developments compatible with surrounding land use designations. The guidelines for site reestablishment include the following:

a. Removal of oil-laden soil

b. Shaping of disturbed lands back to natural grade and the elimination of pad areas, settling ponds, and similar disturbances.

c. Stabilization of sites by seedlings and plantings as appropriate.

d. Other measures as may be stipulated by the State Division of Oil, Gas and Geothermal Resources.

e. Proper identification and abandonment of all oil and natural gas wells.

4.6.4 Impacts and Mitigation Measures

This section describes the methodology used in conducting the California Environmental Quality Act (CEQA) impact analysis for energy; the thresholds of significance used in assessing impacts to energy; and the assessment of impacts to energy, including relevant mitigation measures.

Methodology

This analysis addresses the project's potential energy use, including electricity and transportation fuel. Energy consumption during both construction and operation is assessed. Specific analysis methodologies are discussed below.

The project's energy consumption and demand were evaluated in comparison to the CEQA thresholds of significance to determine whether the project would result in a significant impact related to energy.

Construction

Project construction would require various tasks, including facility pad grading, well drilling, pipeline construction, and others. Table 4.6-1 shows the anticipated construction components and timing per component.

Table 4.6-1: Project Construction Components

Project Component	Construction Duration Per Component
Facilities Pipelines	6 to 12 months
Capture Facilities	12 to 14 months
New Injection and Monitoring Wells	4 to 6 weeks per well
Workover Wells	2 weeks per well
Well Conversion and Drilling Activities	8 to 18 months

Source: Ruettgers & Schuler Civil Engineers 2023

Construction would take 12 to 14 months for construction, commissioning, and start-up to cover the different phases of the project. The most time-consuming component, construction of the CO_2 capture facilities, is expected to take the full 12 to 14 months for construction.

The construction schedule utilized in the analysis represents a "worst-case" analysis scenario because fuel efficiency for construction equipment increases as the analysis year increases, due to improvements in technology and more stringent regulatory requirements. Therefore, the construction energy demand would be less if the construction schedule is adjusted to occur in later years.

Construction Equipment and Transportation

The construction equipment information was provided by based on the Traffic Impact Study (Appendix I). Consistent with the air quality and GHG emissions modeling, each piece of equipment was assumed to be in use for 8 hours per day, with the exception of drill rigs, which were assumed to operate for 24 hours per day.

The potential impacts of vehicular traffic associated with construction trip generation and vehicle miles traveled was evaluated for construction of the facility pipeline, CO_2 injection wells, and CO_2 capture compression and pumping facility.

Pipeline Construction Phase

Traffic generated during the pipeline construction phase would include personnel vehicles and water trucks. These vehicles would access the pipeline along the route under construction at the time. Trip generation estimates for pipeline construction traffic are presented in Table 4.6-2. Construction operations are anticipated to occur between 6:00 a.m. and 5:00 p.m.

Table 4.6.2 summarizes the trips generated by the project using the above assumptions.

Table 4.6.2: Pipeline Construction Phase Trip Generation

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peak Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
1 Ton Work Truck	16 (Per Day)	32	100% 13	0% 0	0% 0	100% 13
5 Ton Utility Flat Bed Truck	6 (Per Day)	12	100% 5	0% 0	0% 0	100% 5
Water Truck	4 (Per Day)	8	100% 1	0% 0	0% 0	100% 1
Total Trips		52	19	0	0	19

Source: Ruettgers & Schuler Civil Engineers 2023
Key:
ADT = average daily traffic
CO_2 = carbon dioxide

As shown in Table 4.6.2, the construction of the pipeline would generate approximately 52 daily trips, with 19 trips during the PM peak hour and 19 trips during the AM peak hour of a typical weekday.

CO_2 Injection Well Construction Phase

Six CO_2 injections wells are planned to be constructed as part of the project. Construction activities are estimated to take approximately 18 days for each well. As shown in Table 4.6.3, the construction of the injection wells would generate approximately 16 daily trips, with eight trips during the PM and PM peak hours of a typical weekday.

Table 4.6.3: CO_2 Injection Well Construction Phase

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peak Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
Passenger Car/Pickup Truck	6 (Per Day)	12	100% 6	0% 0	0% 0	100% 6
Heavy Trucks	2 (Per Day)	4	100% 2	0% 0	0% 0	100% 2
Total Trips		16	8	0	0	8

Source: Ruettgers & Schuler Civil Engineers 2023
Key:
ADT = average daily traffic
CO_2 = carbon dioxide

CO_2 Capture Facility: Compression and Pumping Facility Construction Phase

The CO_2 Compression and Pumping Facility construction phase would generally include personnel vehicles. Anticipated deliveries of materials and equipment would occur on off peak periods and sporadically. Trip generation estimates for capture facility construction traffic is presented in Table 4.6.4. Construction operations are anticipated to occur between 6:00 AM and 5:00 PM.

Table 4.6.4: CO_2 Capture: Compression and Pumping Facility Construction Phase Trip Generation

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peal Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
Worker Vehicle	80 (Per Day)	160	100% 48	0% 0	0% 0	100% 48

Source: Ruettgers & Schuler Civil Engineers 2023
Key:
ADT = average daily traffic
CO_2 = carbon dioxide

As shown in Table 4.6.4, the construction of the CO_2 capture compression and pumping facility would generate approximately 48 daily trips, with 48 trips during the PM peak hour and 48 trips during the AM peak hour of a typical weekday.

The number of daily worker trips is based on the Traffic Impact Study (Appendix I) estimate of the average number of daily workers required for each project component, and assuming two one-way trips per worker per day. Consistent with the air quality and GHG emissions modeling, the worker trip length was estimated at 40 miles per one-way trip. The fleet mix for worker trips is composed of a mixture of passenger cars, light-duty trucks, and medium-duty vehicles.

As shown in the trip generation tables above, the various components of construction of the proposed project would generate 52 trips in either the AM or PM peak hour. There may be periodic overlap of the construction phases, but only for a limited time, and construction activities would have minimal impacts on surrounding accessways as the activities are limited to within the existing Elk Hills facility boundaries. Consistent with the air quality and GHG emissions modeling, the vendor trip length was estimated at 40 miles per one-way trip. The fleet mix for vendor trips was composed of a mixture of light heavy-duty trucks, medium heavy-duty trucks, and heavy heavy-duty trucks.

Operation

"Operational energy use" refers to the energy demand that would occur during operation of the project. The sources are summarized below.

Motor Vehicles

Operation of the project would include five full-time employees who would operate the facility seven days a week, 24 hours a day. An additional five full-time employees could be on site at any given time if repairs or other maintenance work is required. As shown in Table 4.6.5, operation of the project would generate approximately 20 daily trips. It is noted that the maintenance or repair work would occur periodically, and there would generally only be one trip in the peak hour.

Table 4.6.5: CO_2 Facility Operation and Maintenance Phase Trip Generation

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peak Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
Worker Vehicle	10 (Per Day)	20	86% 6	14% 1	14% 1	86% 6

Source: Ruettgers & Schuler Civil Engineers 2023
Key:
ADT = average daily traffic
CO_2 = carbon dioxide

Stationary Sources

The project would involve electricity and natural gas demands for the operation of stationary sources, including of all capture equipment, compression and pumping equipment. Demand factors were provided by the project proponent and are based on project-specific equipment needs.

Thresholds of Significance

The CEQA Appendix G Checklist and the Kern County adopted CEQA thresholds state that a project would have a significant energy impact if it would:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Project Impacts

Impact 4.6-1: The project would result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

The energy requirements for the project were determined using the construction and operational estimates generated from the calculation worksheets for energy consumption (Appendix K-1). This impact addresses the energy consumption from both construction and operations, discussed separately below.

Construction Energy Demand

During construction of the project, energy resources would be consumed in the form of diesel and gasoline fuel from the use of off-road or on-site equipment (i.e., tractors, excavators, cranes) and on-road, or off-site, vehicles (i.e., construction employee commutes, vendor, haul trucks).

Temporary electricity may be required to provide as-necessary lighting and electric equipment; such electricity demand would be met by portable generator sets and, possibly, local distribution. Fuel demand associated with portable generators is incorporated in the off-road equipment estimate provided below. The amount of electricity used during construction would be minimal. Natural gas is not anticipated to be required during construction of the project. The total gallons of fuel, both diesel and gasoline, are shown in Table 4.4-6. Values presented in Table 4.4-6 are derived from CO_2 emissions presented in the Air Quality Impact Analysis (Appendix B-1).

Table 4.6.6: Vehicle Equipment

Project Component	CO_2 Emissions (Ton/Year) [a]		Total Project CO_2 Emissions (Tons/Project)	Carbon Intensity of Fuel (Pounds of CO_2/ Gallon) [b]	Gallons of Fuel	Total Gallons of Fuel (Diesel and Gasoline Combined)
	2024	2025				
Pipeline Construction Phase						
On site	1005.3		1005.3	44.9	98,720	
Off site	96.64		96.64	35.72	11,929	110,649
CO_2 Construction Well Phase						
On site		771.13	771.13	44.9	75,725	
Off site		252.38	252.38	35.72	31,153	106,878
CO_2 Capture: Facility Construction Phase						
On site	679.2	676.6	1355.8	22.45	133,139	
Off site	477.86	459.9	937.76	17.86	115,754	248,894
Project Operations						
Worker Commutes			85	17.86	10,492	10,492
Total Construction On-Road Trips						476,913

Source: Ruettgers & Schuler Civil Engineers 2023

Notes:

[a] CO_2 Emissions from Appendix B of Air Quality Impact Analysis (Trinity 2023)

[b] Carbon Intensity factors from U.S. Energy Information Administration (EIA 2023), assuming all on-site fuel is diesel and all off-site fuel is finished gasoline.

Calculations use unrounded numbers; totals may not appear to sum exactly due to rounding.

Key:

CO_2 = carbon dioxide

Off-Road Equipment

As derived from Table 4.4-6, construction activities associated with the project were estimated to consume 338,573 gallons of diesel fuel from the use of off-road (or on-site) equipment. For comparison, in 2021, approximately 3.7 billion gallons of diesel fuel were consumed within California (USEIA 2023). Thus, the diesel fuel required to power the off-road equipment during construction of the project would represent approximately 0.009 percent of the State's annual diesel demand.

Motor Vehicles

Vehicles for construction workers would require fuel for travel to and from the site during construction. Table 4.6-6 provides an estimate of the total on-road vehicle fuel usage during construction.

As shown above, construction of the project was estimated to consume 476,913 gallons of a combination of gasoline and diesel fuel from construction vehicles. For comparison, in 2021, approximately 10.2 billion gallons of gasoline for motor vehicles was consumed within California (USEIA 2023). Thus, the fuel required to power the on-road motor vehicles during construction of the project would represent approximately 0.0047 percent of the state's annual gasoline demand.

Conclusion

Overall, construction activities associated with the proposed project would result in the consumption of petroleum-based fuels. However, there are no unusual project characteristics that would necessitate the use of construction equipment or vehicles that would be less energy efficient than at comparable construction sites in other parts of the state. Therefore, it is expected that construction fuel consumption associated with the proposed project would not be any more inefficient, wasteful, or unnecessary than at other construction sites in the region.

Operational Energy Demand

During operations of the project, energy would be required to fuel the vehicles travelling to and from the site and to power the proposed equipment, pumps, and facility processes.

Transportation Energy Demand

Table 4.6.7 provides an estimate of the annual fuel consumed by vehicles traveling to and from the project site. As shown in the table, annual vehicular fuel consumption is estimated to be 13,273 gallons of a combination of gasoline and diesel fuel.

Table 4.6.7: Operational Vehicle Fuel Consumption

Vehicle Type	Annual VMT	Average Fuel Economy (miles/gallon)	Total Annual Fuel Consumption (gallons/year)
Worker Vehicles	292,000	22	13,273

Source: Ruettgers & Schuler Civil Engineers 2023 and Appendix B of Air Quality Impact Analysis (Trinity 2023)
Notes:
Calculations use unrounded numbers; totals may not appear to sum exactly due to rounding.
VMT = vehicle miles traveled

As noted previously, in 2021, California consumed approximately 10.2 billion gallons of gasoline (USEIA 2023). The project's anticipated consumption of 13,273 gallons of fuel per year represents approximately 0.00013 percent of the State's annual demand for gasoline. Further, over the lifetime of the project, the fuel efficiency of the vehicles being used by the employees and delivery vehicles is expected to increase. As such, the amount of petroleum consumed as a result of vehicular trips to and from the project site during operation would decrease over time.

Stationary Source Energy Demand

The annual electricity required to operate the carbon capture facility and associated equipment is 15.432 MW/year for each phase or 30.864 (rounded to 31) MW/year total. Electricity would be sourced from the Elk Hills Power Plant. No new sources of electricity would be required to serve the project.

Although the project would result in increased demand for energy resources within the Elk Hills oilfield, the energy would be consumed efficiently and would be typical of industrial carbon capture projects. In addition, carbon capture and sequestration projects, such as the proposed project, are essential to achieve the State's climate goals (CARB 2022); as a result, any energy consumed by the project is not considered to be wasteful or unnecessary.

Conclusion

Based on the analysis above, the project would consume energy resources during construction and operation for the initial source. However, the energy consumption associated with the proposed project source would not be inefficient, wasteful, or unnecessary.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.6-2: The project would conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Construction

During construction, off-road equipment and on-road vehicles would comply with all applicable federal and state requirements. For example, all off-road equipment would be subject to the most recent In-Use Off-Road Diesel-Fueled Fleets Regulations adopted by the CARB, which establish engine efficiency requirements, among other requirements (CARB 2023). Off-road engines are categorized per engine tier, with Tier 0 being the least efficient and Tier 4 Final being the cleanest and most efficient. Compliance with the In-Use Off-Road Diesel-Fueled Fleets Regulations would ensure that the project construction fleet would consist of energy-efficient engines. With respect to the on-road vehicle fleet operations, the EPA and NHTSA have adopted Federal Vehicle Standards, with which the project would comply. The on-road construction fleet would incorporate these standards as construction staff purchase newer model trucks and turn over their fleet. As such, these regulations would have an overall beneficial effect on reducing nationwide fuel consumption over time as older trucks are replaced. Moreover, heavy-duty trucks would be required to comply with CARB's 5-minute idling limits, which would reduce fuel consumption. Although the these regulations were primarily designed to reduce air quality emissions, they would also result in an increase in energy efficiency during construction.

Operation

California adopted the RPS to increase the amount of renewable energy supplied by utilities within the State. In addition, any new structures developed as part of the project would comply with federal, State, and local regulations aimed at reducing energy consumption, including the Building Energy Efficiency Standards (CCR Title 24, Part 6) the CALGreen Code (CCR Title 24, Part 11). Moreover, the project directly supports the goals laid out in CARB's 2022 Scoping Plan, including the measures related to carbon capture and sequestration. Finally, the project would be subject to CARB's Carbon Capture and Sequestration Protocol under the LCFS (CARB 2018b). The LCFS requirements are designed to decrease the carbon intensity of fuels and increase the range of renewable alternatives; therefore, the project's compliance with the CARB's Carbon Capture and Sequestration Protocol would indirectly support the State plan for renewable energy.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

4.6.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project, together with the impacts of past, present and reasonably foreseeable future oil and gas development, including wells and abandonment activity to implement carbon capture and storage projects, constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities, and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The aforementioned documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection

and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, SB 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. The California Geologic Energy Management Division permitting for all wells, with the exception of plugging and abandonments, has never averaged over 2,000 permits a year (as implementation in some years of the County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts on energy resources is Kern County. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on energy resources. This geographic scope of analysis is appropriate because energy resources within this area are expected to be similar to those in the project site because of their proximity and similar environments would result in similar land-use—and thus, site types.

Impact 4.6-3: Contribute to Cumulative Energy Impacts

With regard to energy, the project has the potential to contribute significantly to cumulative impacts within the study area. A complete analysis of the cumulative impacts of the various energy generating activities from oil and gas are provided in Chapter 4.6, *Energy*, of the Kern County Oil and Gas EIR.

The main contribution of energy consumption from the project would be construction equipment usage, haul truck trips, and employee trips during the construction phase, and maintenance trips and employee trips during project operation. However, construction emissions would be finite and temporary and would cease at the end of construction activities.

While the use of the estimated 31 MW for the project is not significant, the cumulative impacts of the known and unknown carbon capture and storage (CCS) projects in the PG&E service area may be. The consumption of 30.864 (rounded to 31 MW) MW per year of electricity to capture and store CO_2 is a diversion of electricity from other residential and commercial uses. An estimated 12,194 to 30,000 homes could be provided electricity from this one capture facility usage. Further using a conservative estimate that the four other known CCS projects listed in Chapter 3, *Project Description*, would each use 31 MW, the total consumption of electricity from just one source to capture and store CO_2 would be 124 MW—the equivalent of power for 49,600 to 124,000 homes. Even using renewable energy such as solar would divert electricity from other needs in the region. As the other sources for the total injection maximum yearly of 2,210,000 for this one project could divert a significant amount of electricity from other residential, commercial, and industrial uses. Tracking the energy efficiency and consumption of the capture facilities utilized with this initial source and each subsequent source will ensure that energy planning in the region accounts for the carbon removal activities and encourage energy conservation and better efficiency for each new source. MM 4.6-1 requires an annual report of electricity consumption for all sources permitted to

provide CO_2 for injection and storage and evaluation of any methods to reduce the consumption of any forms of electricity in the capture process. The cumulative impacts on the regional grid, which have not been determined to meet the CARB 2045 goals for production, are significant and unavoidable even with mitigation.

Mitigation Measures

MM 4.6-1 The operator shall provide an annual report on the total amount of electricity consumed by the carbon capture facilities associated with sources that send CO_2 for injection into the project storage site. The report shall detail the facility the source of the power and the annual amount. The report shall include a discussion of modifications that are being considered by each source to reduce electricity use. The first report is due the 13th month after the first month injection commences. The report shall be provided to the Kern County Planning and Natural Resources Agency, EPA UIC Permit Division, California Air Resources Board, California Public Utilities Commission, California Energy Commission, and California Independent System Operators.

Level of Significance after Mitigation

Cumulative impacts would be significant and unavoidable.

Section 4.7

Geology and Soils

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Section 4.7

Geology and Soils

4.7.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for geology and soil resources. It also describes the impacts on geologic and soil resources that would result from implementation of the California Resources Corporation's (project proponent) proposed Carbon TerraVault I (Kern County) Project (project). The project site is a specific set of parcels within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself (see Chapter 3, *Project Description*). Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

The analysis in this section is based on the "Preliminary Soil and Geological Evaluation Terra Vault I Carbon Capture Project" report prepared by Quad Knopf in October 2023 (Quad Knopf 2023; Appendix E-1) and the U.S. Environmental Protection Agency Class VI Underground Injection Control (UIC) Permit Application Narratives for the Elk Hills 26R Storage Project and the A1A2 Storage Project, which are included as Appendix E-2, respectively, to this Draft EIR and incorporated by reference herein. Information was obtained from Section 4.6, *Geology and Soils*, of the Kern County *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015), supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding oilfield environmental impacts and cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152).

A description of the environmental setting (affected environment) for geology and soils is presented below in Section 4.7.2, *Environmental Setting*, including discussion of the regional and local setting. The regulatory setting applicable to geology and soils is presented in Section 4.7.3, *Regulatory Setting*, and Section 4.7.4, *Impacts and Mitigation Measures*, discusses project impacts and associated mitigation measures.

4.7.2 Environmental Setting

Regional Geologic Setting

The project would be located on 9,104 acres of land in the Elk Hills area that is currently agricultural land or vacant land in the Central Valley portion of the county. The project site is located in the San Joaquin Valley, within the southern half of the Great Valley Geomorphic Province of California. The Great Valley is characterized by a broad alluvial plain extending over 400 miles through Central California and reaching up to 50 miles wide. The San Joaquin Valley is approximately 200 miles long and up to 70 miles wide. The northern portion of the San Joaquin Valley is drained by the San Joaquin River, which flows from east-central California to the San Francisco Bay before reaching the Pacific Ocean. The southern portion of the San Joaquin Valley drains into two terminal lake beds: Tulare Lake and Buena Vista Lake. Geologically, the San Joaquin Valley structural trough is characterized by marine and continental sedimentary deposits that reach thicknesses of up to 32,000 feet.

Paleontological Setting

A review was conducted by the San Diego Natural History Museum (SDNHM) to assess the paleontological resource potential within the project area (Appendix E-4). The Pleistocene-age Tulare Formation underlies the entire project area and records the transition from the marine conditions that dominated the Miocene and Pliocene history of the San Joaquin basin and the estuarine, lacustrine, fluvial, and alluvial fan conditions that characterized the Quaternary history of the basin.

The SDNHM does not have any recorded fossil collection localities within a 1-mile radius of the project area. The nearest recorded SDNHM fossil locality from the Tulare Formation is located in the Buena Vista Hills, approximately 6 miles south of the southeast end of the project site. A partial snake vertebra, whole and partial vertebrae of lizards, lizard jaws with teeth, and numerous teeth and a dentary fragment of the cotton rat. Additional rodent cheek teeth, incisors, and jaw fragments were recovered, along with postcranial elements of unidentified mammals. The Tulare Formation has produced important fossil remains of plants (silicified wood and pond weed algae), freshwater organisms (diatoms, ostracods, clams, mussels, snails, bony fishes, and the river dolphin), and terrestrial mammals, including horses, tapirs, camels, deer, elk, ground sloths, coyotes, bears, rabbits, gopher, mice, wood rats, squirrels, and the holotype specimens of an extinct bone-crushing dog and saber-toothed cat. These scientifically significant finds demonstrate the high paleontological potential of the Tulare Formation.

Local Geologic Setting

According to the 2010 Geologic Map of California, the zone of influence for the project is located wholly within Quaternary Pliocene-Pleistocene nonmarine sedimentary rocks (QPc) consisting of sandstone, shale, and gravel deposits; mostly loosely consolidated within Elk Hills. Elk Hills is located about 25 miles southwest of Bakersfield, within the San Joaquin Valley in Kern County, California. The San Joaquin Valley is a large alluvial plain bordered by the Sierra Nevada on the

east, the Diablo and Temblor Ranges on the west, the Tehachapi Mountains on the south, and the San Joaquin River on the north. The San Joaquin Valley is filled with alluvial sediments generally thousands-of-feet thick and eroded from the mountains on all sides. Elk Hills is an anticline, composed of stratified alluvial soils that have been uplifted.

The Sierra Nevada, the most eastern province, is an immense section of granite that has been uplifted and tilted to the west. The Coast Ranges, which compose the westernmost province, are an anticlinorium in which the Mesozoic and Cenozoic sedimentary rocks are complexly folded and faulted. Between the Sierra Nevada and Coast Ranges is the San Joaquin basin. When the basin first formed it was an inland sea between the two mountain ranges. Over time, the Sierra Nevada volcanics and Coast Range sediments were eroded and filled the inland sea in what has become the San Joaquin basin. This sediment included Monterey Formation turbidite sands that prograde across the deep floor of the southern basin.

At the surface, Elk Hills presents as a large west-northwest/east-southeast trending anticlinal structure approximately 17 miles long and over seven miles wide. With increasing depth, the structure sub-divides into three distinct anticlines, separated at depth by inactive high-angle reverse faults. The anticlines formed in the middle Miocene and are associated with uplift due to southern basin shortening from the San Andreas Fault.

Stratigraphy

Major stratigraphic intervals include, from youngest to oldest, the Temblor Formation, Monterey Formation, and Reef Ridge Shale. The Tertiary and Quaternary deposits underlying Elk Hills and nearby areas are up to 24,000 feet thick. The Tulare Formation lies at the surface of the Elk Hills and consists of alternating beds of nonmarine sand, gravel, silt, and clay (most noticeably the Amnicola, Tulare and Corcoran clay units). The Tulare Formation consists of both unsaturated and saturated zones. The upper units of the Tulare Formation are mostly unsaturated, while the lower units can be saturated with both water and oil. The Tulare Formation is a thick succession of nonmarine, poorly consolidated sandstone, conglomerate, and claystone beds, which are exposed at intervals along the west border of the San Joaquin Valley. The Pleistocene-aged Tulare Formation can be divided into the Upper Tulare and Lower Tulare members, separated by a continuous low permeability claystone (Amnicola Clay).

The conformable base of the Tulare represents a facies transition from Tulare Formation nonmarine fluvial and alluvial sediments to the shallow marine siltstones and shales of the San Joaquin Formation. The Upper Tulare Formation outcrops at Elk Hills and can be overlain by undifferentiated quaternary strata. The Upper Tulare is an unsaturated air sand above the Monterey Formation 26R reservoir. The Lower Tulare Formation was approved as an exempt aquifer in 2018.

The Tulare Formation has been folded into a large compound anticline consisting of two subsidiary anticlines commonly referred to as the 29R and the 31S structures. The 29R structure is tightly folded, asymmetrical and faulted. The 31S structure is cut by numerous minor faults, four of which reach the surface in the northeast flank of the structure. Other faults in the shallow out-bearing beds do not reach the surface. Smaller “earthquake cracks” along and parallel to the extreme north flank

trend approximately perpendicular to the surface faults. Most noticeable among these cracks or small faults is the Tupman fault, which is a fracture cutting post-Tulare fan deposits with strike-slip and vertical displacement in the northeast flank of Elk Hills.

The upper portion of the San Joaquin Formation consists mostly of shale, interbedded clayey siltstone, and silty sandstone. The sandstone is scattered through the interval and is thin, very-fine to fine-grained sand and silt. The upper contact of the formation with the Tulare Formation is marked in most places by a pronounced lithologic change upward from shale to poorly sorted feldspathic sandstone and conglomerate. In some places, the lower beds of sandstone and conglomerate of the Tulare Formation interfinger with the San Joaquin beds. The lower San Joaquin Formation is composed of consolidated to semi-consolidated sandstone, siltstone, and shale of marine origin. The lower San Joaquin Formation contains the Mya Gas Sands, lenticular sand bodies that are charged with gas and are encased in claystone.

The marine deposited and Pliocene-aged Etchegoin Formation is present in the subsurface across most of the southern San Joaquin basin. At Elk Hills, the formation is 1,500 to 4,000 feet in depth and consists of a lower silty shale member and an upper sandy interval. The sand dominated sequences consist of multiple sands that are 10 feet in thickness, 29 to 37 percent porosity, 32 to 826 millidarcy permeability and can contain oil. Between sand reservoirs are laterally continuous shales that are sealing and prevent hydraulic communication from above and below.

The Reef Ridge directly overlies the 26R Monterey Formation sequestration reservoir and has successfully contained oil and gas operations for over 40 years and original oil and gas deposits for millions of years. The Reef Ridge Shale is dominated by gray to grayish-black silty or sandy shale with rare silty and clay beds. At Elk Hills, the Reef Ridge Shale is continuous and ranges from 750 to 1,600 feet thick.

The 26R Monterey Formation sequestration reservoir is approximately 6,000 feet deep and produces from turbidite sands. Turbidite deposited sands are interbedded with and bound above and below by siliceous shale. The 26R Monterey Formation sands were deposited as a turbidite channel influenced by the growing Elk Hills structure at the time of deposition. In Elk Hills, the structure occurs synchronously with deposition. Although the Monterey Formation was deposited over the entire San Joaquin basin, sands are sourced from the Sierra Nevada, San Emigdio, and Coast Range highlands, with deposition occurring in fairways. This depositional framework minimizes lateral communication of the Monterey Formation outside Elk Hills.

Surface Soils

The project area soils consist of the following surface soils as mapped by the U.S. Department of Agriculture:

Western Portion:

- Elkhills-Torriorthents stratified complex, well drained, 9 to 15 percent slopes
- Kimberlina sandy loam, well drained, 5 to 9 percent slopes

- Elkhills sandy loam, eroded, well drained, 9 to 50 percent slopes
- Elkhills-Torriorthents stratified, eroded complex, well drained, 15 to 50 percent slopes

Eastern Portion:

- Torriorthents stratified, eroded-Elkhillls complex, well drained, 9 to 50 percent slopes
- Elkhills-Torriorthents Stratified Complex, well drained, 9 to 15 percent slopes
- Kimberlina sandy loam, well drained, 5 to 9 percent slopes
- Elkhills sandy loam, eroded, well drained, 9 to 50 percent slopes
- Elkhills-Torriorthents stratified, eroded complex, well drained, 15 to 50 percent slopes

The wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. The wind erodibility index ranges from 56 to 86 tons per acre per year throughout both areas of interest (Western Portion and Eastern Portion). Most of the soils between both site areas have a wind erodibility index of 56 tons per acre per year. Based on the wind erodibility index range within the project area, the project site is not significantly susceptible to wind erosion.

Faults and Seismic History

Elk Hills is in a seismically active region, but the State of California (State) geologist of the California Geological Survey has not identified any active faults in the Elk Hills area. The San Joaquin Valley is seismically active outside Elk Hills, but no basin-wide events have impacted the Elk Hills reservoirs or oil and gas infrastructure. This is due, in part, to the thickness and high level of clay in the primary confining layer Reef Ridge Shale. The project site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone, where site-specific studies addressing the potential for surface fault rupture are required. Several smaller and less active, unnamed faults within the Sierra Nevada Fault system are also located relatively close to the project site (USGS 2023). Three smaller, northwest-oriented faults and one northeast-oriented fault have been mapped near the project site to the west and southwest; however, they do not cross the project site.

Active seismicity near the project site is related to the San Andreas Fault (located 14 miles west of Elk Hills) and the White Wolf Fault (25 miles southeast of Elk Hills). Activity on these faults occurs far deeper than the Monterey Formation (approximately 8,500 feet), at about 6 miles below surface. Within Elk Hills, there have been no earthquakes recorded greater than 3.0. There have been eight earthquakes with a magnitude of 5.0 or greater within a 30-mile radius of Elk Hills. The average depth of these earthquakes is 6.3 miles.

The 1952 Kern County earthquake, the largest in the region, occurred southeast of Elk Hills near Frazier Park, with an estimated magnitude of 7.5. Effects of the earthquake were catastrophic, with loss of life and significant property damage. Regionally, there were no reservoir containment issues associated with oil and gas operations and the Reef Ridge Shale. Moreover, there was no impact to Elk Hills infrastructure.

Fault Rupture

Ground surface rupture along an earthquake fault may cause damage to aboveground infrastructure and other features. The State has mapped known active faults that may cause surface fault rupture in inhabited areas as part of the Alquist-Priolo Earthquake Fault Zoning Act. As mentioned above, the project site is not located within an Earthquake Fault Zone regulated under the Alquist-Priolo Earthquake Fault Zoning Act.

Slope Stability

No evidence of historic landslides or creep was observed within the project area. Some of the steeper slopes and cuts for roads and drilling pads displayed some erosional features, such as rills and gullies from stormwater flow. There is a low-to-moderate potential for rockfalls or landslides to impact the site during a major earthquake. Overall, the site appears to be stable.

Soil Hazards

Geologic hazards associated with soil characteristics include erosion, expansion ("shrink–swell" patterns), and settlement, as described below.

Erosion

Soil erosion occurs when surface materials are worn away from the earth's surface due to land disturbance and/or natural factors such as wind and precipitation. Characteristics such as texture and content, surface roughness, vegetation cover, and slope grade and length determine the potential for soil erosion. Wind erosion typically occurs when fine-grained, noncohesive soils are exposed to high velocity winds, while water erosion tends to occur when loose soils on moderate and steep slopes are exposed to high-intensity storm events.

Within the project site, erosional drainage features were observed along or adjacent to some of the existing pipelines as well as to the proposed injection pipelines. These included rills and gullies formed by flowing water erosion.

According to the Kern County General Plan (KCGP) Safety Element, the project site is not within a zone that is prone to soil erosion. The proposed site has undulating topography, which would need to be graded properly to minimize the possibility for the formation of significant rills or gullies by water. With respect to soil erosion by wind, earthwork at the site during construction might cause some disturbed soils to be affected by wind erosion.

Expansion

Soils that expand and contract in volume ("shrink–swell" pattern) are considered to be expansive and may cause damage to aboveground infrastructure as a result of density changes that shift overlying materials. Fine-grain clay sediments are most likely to exhibit shrink–swell patterns in response to changing moisture levels.

Within the project site, near-surface soils encountered in previous geotechnical investigations and mapped by the U.S. Department of Agriculture and presented on the Web Soil Survey, indicate that expansive soils may be located in the project area. Expansive soils have the potential to cause displacement and possible damage to surface improvements such as concrete slab-on-grade floors and exterior walkways. The potential effects of the shrinking and swelling of expansive soils and the associated impacts can be mitigated through prudent grading and design of the structures. Some of the soils in the project area have a clay fraction and may be expansive. A design-level geotechnical investigation would be required to confirm the status of expansive soils in the project area.

Settlement

The settlement of soils is characterized by sinking or descending soils that occurs as the result of a heavy load being placed on underlying sediments and may be triggered by seismic events. Seismically induced settlement is dependent on the relative density of the subsurface soils.

Within the project site, a design-level geotechnical investigation would be required to confirm the potential for seismic settlement in the project area.

Subsidence

Subsidence is the settlement of the ground surface over large areas, and it has been documented throughout California, including the San Joaquin Valley. Tectonic subsidence refers to the long-term slow sinking of the land surface. Subsidence can also occur naturally when moisture-deficient soils are exposed to water, which causes collapse. Subsidence has also been caused by human activities, including the extraction of oil and gas and the withdrawal of groundwater. Historical and current areas of land subsidence are documented by the U.S. Geological Survey (USGS) California Water Science Center (USGS n.d.). According to the USGS, the proposed project site is not located within an area of land subsidence.

Liquefaction and Landslides

Liquefaction is the phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of earthquake-induced strong ground shaking. Liquefaction can produce excessive settlement, ground rupture, lateral spreading, or failure of shallow bearing foundations. To determine the liquefaction susceptibility of a region, three major factors must be analyzed. These include: (1) the density and textural characteristics of the alluvial sediments; (2) the intensity and duration of ground shaking; and (3) the depth to groundwater. Zones of Required Evaluation referred to as “Seismic Hazard Zones” in California Code of Regulations Article 10, Section 3722, are areas shown on Seismic Hazard Zone Maps where site evaluations are required to determine the need for mitigation of potential liquefaction and/or earthquake-induced landslide ground displacements. There are no mapped areas that have Seismic Hazard Zones for liquefaction or landslides within the project area.

The depth to groundwater, based on recent data, is greater than 100 feet below ground surface and historical data indicate that no shallow groundwater would be expected within the project area.

Therefore, potential for the project site soils to experience liquefaction during a seismic event would be confirmed with a design-level geotechnical investigation.

No evidence of historic landslides or creep was found within the project area. Some of the steeper slopes and cuts for roads and drilling pads depicted some erosional features, such as rills and gullies from stormwater flow. There is a low-to-moderate potential for rockfalls or landslides to impact the site during a major earthquake.

Lateral Spreading

Lateral spreading is a potential hazard commonly associated with liquefaction where extensional ground cracking and settlement occur following lateral migration of subsurface liquefiable material. These phenomena typically occur adjacent to free faces, such as slopes and creek channels. Considering the general topography of the project site terrain and the likely absence of liquefaction, lateral spreading would be unlikely.

4.7.3 Regulatory Setting

Geologic and soil resources and geotechnical hazards are governed primarily by local jurisdictions. The conservation elements and seismic safety elements of city and county general plans contain policies for the protection of geologic features and avoidance of hazards.

CEQA is the major environmental statute that guides the design and construction of projects on nonfederal lands in California. This statute sets forth a specific process of environmental impact analysis and public review. In addition, the project proponent must comply with other applicable State and local applicable statutes, regulations, and policies. Relevant and potentially relevant statutes, regulations, and policies are discussed below.

Federal

Clean Water Act

The Clean Water Act (CWA) (33 United States Code Section 1251 et seq.) was enacted to restore and maintain the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain nonpoint-source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). Projects that disturb 1 acre or more of land are required to obtain NPDES coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, State Water Resources Control Board Order No. 2022-0057-DWQ. The General Permit requires the development and implementation of a storm water pollution prevention plan (SWPPP), which includes best management practices (BMPs) to protect storm water runoff.

Requirements of the CWA and associated SWPPP requirements are described in further detail in Section 4.10, *Hydrology and Water Quality*.

State

Alquist-Priolo Earthquake Fault Zoning Act of 1972

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 regulates development and construction of buildings intended for human occupancy to avoid the hazard of surface fault rupture. In accordance with this law, the California Geological Survey maps active faults and designates Earthquake Fault Zones along mapped faults. The Alquist-Priolo Earthquake Fault Zoning Act groups faults into categories of active, potentially active, and inactive. Historic- and Holocene-age faults are considered active, Late Quaternary- and Quaternary-age faults are considered potentially active, and pre-Quaternary-age faults are considered inactive. These classifications are qualified by the conditions that a fault must be shown to be "sufficiently active" and "well defined" by detailed site-specific geologic explorations to determine whether building setbacks should be established. Any project that involves the construction of buildings or structures for human occupancy, such as an operation and maintenance building, is subject to review under the Alquist-Priolo Earthquake Fault Zoning Act, and any structures for human occupancy must be located at least 50 feet from any active fault.

Seismic Hazards Mapping Act of 1990

In accordance with Public Resources Code, Chapter 7.8, Division 2, the California Geological Survey delineates Seismic Hazard Zones through the Seismic Hazards Zonation Program. The purpose of the Seismic Hazards Mapping Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards, such as those associated with strong ground shaking, liquefaction, landslides, other ground failures, or other hazards caused by earthquakes. Cities, counties, and State agencies are directed to use Seismic Hazard Zone Maps developed by the California Geological Survey in their land use planning and permitting processes. In accordance with the Seismic Hazards Mapping Act, site-specific geotechnical investigations must be performed prior to permitting most urban development projects within Seismic Hazard Zones.

California Integrated Seismic Network

The California Integrated Seismic Network (CISN) began in November 2000 with the mission to operate a reliable, modern, statewide system for earthquake monitoring, research, archiving, and distribution of information for the benefit of public safety, emergency response, and loss mitigation. The CISN seeks to mitigate the impact of future earthquakes by collecting, processing, and disseminating critical earthquake information in a timely way.

Six organizations collaborate in the CISN to monitor earthquakes and collect data to support improvements to earthquake resilience. Core members of the CISN are the California Geological Survey, the California Institute of Technology Seismological Laboratory, the University of California–Berkeley Seismological Laboratory, U.S. Geological Survey (USGS) Menlo Park,

USGS Pasadena, and the California Governor's Office of Emergency Services. The CISN has three management centers with different responsibilities:

- Southern California Earthquake Management Center: California Institute of Technology and USGS Pasadena
- Northern California Earthquake Management Center: University of California– Berkeley and USGS Menlo Park
- Center For Engineering Strong Motion Data

The Northern and Southern California earthquake management centers operate as twin earthquake processing centers. The engineering earthquake management center has the lead responsibility for producing engineering data products.

California Building Code

The California Building Code (2022) contains general building design and construction requirements relating to fire and life safety, structural safety, and access compliance.

In accordance with California Building Code Chapter 18, Soils and Foundations, geotechnical investigations shall be conducted in accordance with Section 1803.2 and reported in accordance with Section 1803.6. Where required by the building official or where geotechnical investigations involve in situ testing, laboratory testing or engineering calculations, such investigations shall be conducted by a registered design professional.

Senate Bill 905

The Creation of a Carbon Capture Regulatory Framework (Senate Bill [SB] 905) was passed by the California Legislature in September 2022. SB 905 requires the California Air Resources Board (CARB) to establish a Carbon Capture, Removal, Utilization and Storage Program (CCUS) to evaluate CCUS and carbon dioxide removal (CDR) technologies.

More specifically, SB 905 requires CARB to:

- Establish a "Carbon Capture, Removal, Utilization and Storage Program to evaluate the efficacy, safety, and viability of CCUS." CARB will also be required to enhance monitoring procedures for leakage.
- Ensure that carbon dioxide (CO_2) capture, removal, and sequestration projects include specified components including, among others, certain monitoring activities.
- Adopt regulations for a unified permit application and for the construction and operation of CCUS projects (including an expedited review process) by January 1, 2025. All CCUS projects within California are required to use this application process and CARB will develop a centralized public database to track all in-state projects.

- Develop a centralized public database to track the deployment of CCUS and CDR technologies and the development of CO_2 capture, removal, and sequestration projects throughout the state by January 1, 2025.
- Adopt protocols to support additional and new methods for CO_2 utilization and CO_2 storage by January 1, 2025.
- Adopt financial responsibility regulations for CCUS projects that require the CO_2 storage operator to maintain financial responsibility for not less than 100 years after the last date of injection by January 1, 2025.
- Publish a framework for governing agreements regarding two or more tracts of land overlying the same geologic storage reservoir or reservoirs by July 1, 2025. The agreements will set out to manage, develop, and operate CCUS or CDR projects. SB 905 ensures that title to any geologic storage reservoir for CO_2 is vested in the owner of the overlying surface estate (unless it has been severed and separately conveyed).
- SB 905 also requires CARB to include monitoring and reporting requirements for CO_2 storage operators, establish a working group on CO_2 storage, and restrict CO_2 injection into Class II injection wells for the purposes of enhanced oil recovery.
- SB 905 requires the State Geologist to report seismic activity or leakage of CO_2 from a CCUS project to the state board and may recommend changes in the operations of the project to the state board. The state board may require changes in operations of a CCUS project to ensure public and environmental health and safety, including, but not limited to, a mandatory pause in operation, if the monitoring and reporting detects increased seismicity or CO_2 leakage outside of the geologic storage reservoir.

Additionally, SB 905 requires:

- CCUS project operators to provide at least a 60-day written notice to each surface or subsurface owner adjacent to a geologic storage complex or reservoir before commencing development. Project operators must also prove and maintain financial responsibility for the project. Agreements between operators and relevant parties, that any drilling or extraction be prohibited in the geologic storage reservoir for at least 100 years after the CO_2 is injected, must be made for every project. All project operators also need to create an air monitoring and mitigation plan that is submitted to CARB.
- Require changes in operations of a CO_2 capture, removal, or sequestration project to ensure public and environmental health and safety if the monitoring and reporting detects increased seismicity or CO_2 leakage outside the geologic storage reservoir.

Senate Bill 1314

Critics of CCUS projects using underground sequestration are concerned that such injections can increase pressures in storage locations proximate to oil and gas reserves, (in)directly enhancing further recovery of carbon-based fuels. SB 1314 “plugs this hole” in part by prohibiting a CCUS project operator from injecting a concentrated CO_2 fluid produced by a CO_2 capture project or a

CO_2 capture and sequestration project into a Class II injection well for purposes of enhanced oil recovery, including the facilitation of enhanced oil recovery from another well.

Geologic Carbon Sequestration Group

The Geologic Carbon Sequestration Group is now mandated to provide (Public Resources Code [PRC 2213(a)] independent expertise and regulatory guidance to CARB, including, but not limited to:

- Identification of high-quality, suitable locations for Class VI injection wells (Class VI is the U.S. Environmental Protection Agency's designation for wells used to inject CO_2 into deep rock formations for purposes of long-term sequestration).
- Identification of appropriate subsurface monitoring to ensure geologic sequestration of injected CO_2.
- Identification of hazards that may require the suspension of CO_2 injections.
- The state geologist shall report seismic activity or (subsurface) leakage of CO_2 from a CO_2 capture, removal, or sequestration project to the state board and may recommend changes in the operations of the project to the state board (PRC 71463).

Local

Construction and operation of the project are subject to policies and regulations contained within the KCGP, the Kern County Zoning Ordinance, and the Kern County Code of Building Regulations, which include policies for the avoidance of geologic hazards and/or the protection of unique geologic features, as well as for the preservation of paleontological resources (see Section 4.5, *Cultural Resources*, for discussion of paleontological resources relevant to the project). The policies, goals, and implementation measures in the KCGP for geology and soils applicable to the project are provided below. The KCGP contains additional policies, goals, and implementation measures that are more general in nature and are not specific to development such as the project. These measures are not listed below, but as stated in Chapter 2, *Introduction*, all policies, goals, and implementation measures in the KCGP are incorporated by reference.

Kern County General Plan

The project site is located within the KCGP. The policies, goals, and implementation measures in the KCGP applicable to geology and soils as related to the project are provided below. The KCGP contains additional policies, goals, and implementation measures that are more general in nature and not specific to development such as the project. Therefore, they are not listed below.

Chapter 1. Land Use, Open Space, and Conservation Element

1.3 – Physical and Environmental Constraints

Policies

Policy 1. Kern County will ensure that new developments will not be sited on land that is physically or environmentally constrained (Map Code 2.1 [Seismic Hazard], Map Code 2.2 [Landslide], Map Code 2.3 [Shallow Groundwater], Map Code 2.5 [Flood Hazard], Map Codes from 2.6 – 2.9, Map Code 2.10 [Nearby Waste Facility], and Map Code 2.11 [Burn Dump Hazard]) to support such development unless appropriate studies establish that such development will not result in unmitigated significant impact.

Policy 6. Regardless of percentage of slope, development on hillsides will be sited in the least obtrusive fashion, thereby minimizing the extent of topographic alteration required and reducing soil erosion while maintaining soil stability.

Policy 7. Ensure effective slope stability, wastewater drainage, and sewage treatments in areas with steep slopes are adequate for development.

1.10.3 - Archaeological, Paleontological, Cultural, and Historical Preservation

Implementation Measure

Measure M. In areas of known paleontological resources, the County should address the preservation of these resources where feasible.

Chapter 4. Safety Element

4.3 – Seismically Induced Surface Rupture, Ground Shaking, and Ground Failure

Policy

Policy 1. The County shall require development for human occupancy to be placed in a location away from an active earthquake fault in order to minimize safety concerns.

4.5 – Landslides, Subsidence, Seiche, and Liquefaction

Policy

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.

Policy 3. Reduce potential for exposure of residential, commercial, and industrial development to hazards of landslide, land subsidence, liquefaction, and erosion.

Kern County Code of Building Regulations – Title 17

All construction in the county is required to conform to the Kern County Building Code (Chapter 17.08, Building Code, of the Kern County Code of Regulations). Kern County has adopted the California Building Code, 2019 Edition, with some modifications and amendments. The entire county is in Seismic Zone 4, a designation previously used in the Uniform Building Code to denote the areas of highest risk to earthquake ground motion. California has established an Unreinforced Masonry program that details seismic safety requirements for Zone 4. Seismic provisions associated with Seismic Zone 4 have been adopted.

Chapter 17.28 of Kern County Grading Code

The purpose of the Kern County Grading Code is to safeguard life, limb, property, and the public welfare by regulating grading on private property. All requirements of the Kern County Grading Code would be applied during project implementation. All required grading permit(s) would be obtained prior to commencement of construction activities. Sections of the Grading Code that are particularly relevant to geology and soils are provided below.

Section 17.28.140 Erosion Control

A. Slopes. The faces of cut and fill slopes shall be prepared and maintained to control against erosion. This control may consist of effective planting. The protection for the slopes shall be installed as soon as practicable and prior to calling for final approval. Where cut slopes are not subject to erosion due to the erosion-resistant character of the materials, such protection may be omitted.

B. Other Devices. Where necessary, check dams, cribbing, riprap or other devices or methods shall be employed to control erosion and provide safety.

C. Temporary Devices. Temporary drainage and erosion control shall be provided as needed at the end of each workday during grading operations, such that existing drainage channels would not be blocked. Dust control shall be applied to all graded areas and materials and shall consist of applying water or another approved dust palliative for the alleviation or prevention of dust nuisance. Deposition of rocks, earth materials, or debris onto adjacent property, public roads, or drainage channels shall not be allowed.

Section 17.28.170 Grading Inspection

A. General. All grading operations for which a permit is required shall be subject to inspection by the building official. Professional inspection of grading operations and testing shall be provided by the civil engineer, soils engineer, and the engineering geologist retained to provide such services in accordance with Subsection 17.28.170(E) for engineered grading and as required by the building official for regular grading.

B. Civil Engineer. The civil engineer shall provide professional inspection within such engineer's area of technical specialty, which shall consist of observation and review as to

the establishment of line, grade, and surface drainage of the development area. If revised plans are required during the course of the work, they shall be prepared by the civil engineer.

C. Soils Engineer. The soils engineer shall provide professional inspection within such engineer's area of technical specialty, which shall include observation during grading and testing for required compaction. The soils engineer shall provide sufficient observation during the preparation of the natural ground and placement and compaction of the fill to verify that such work is being performed in accordance with the conditions of the approved plan and the appropriate requirements of this chapter. Revised recommendations relating to conditions differing from the approved soils engineering and engineering geology reports shall be submitted to the permittee, the building official and the civil engineer.

D. Engineering Geologist. The engineering geologist shall provide professional inspection within such engineer's area of technical specialty, which shall include professional inspection of the bedrock excavation to determine if conditions encountered are in conformance with the approved report. Revised recommendations relating to conditions differing from the approved engineering geology report shall be submitted to the soils engineer.

E. Permittee. The permittee shall be responsible for the work to be performed in accordance with the approved plans and specifications and in conformance with the provisions of this Code, and the permittee shall engage consultants, if required, to provide professional inspections on a timely basis. The permittee shall act as a coordinator between the consultants, the contractor and the building official. In the event of changed conditions, the permittee shall be responsible for informing the building official of such change and shall provide revised plans for approval.

F. Building Official. The building official may inspect the project at the various stages of the work requiring approval to determine that adequate control is being exercised by the professional consultants.

G. Notification of Noncompliance. If, in the course of fulfilling their responsibility under this chapter, the civil engineer, the soils engineer, or the engineering geologist finds that the work is not being done in conformance with this chapter or the approved grading plans, the discrepancies shall be reported immediately in writing to the permittee and to the building official. Recommendations for corrective measures, if necessary, shall also be submitted.

H. Transfer of Responsibility. If the civil engineer, the soils engineer, or the engineering geologist of record is changed during the course of the work, the work shall be stopped until:

1. The civil engineer, soils engineer, or engineering geologist has notified the building official in writing that they will no longer be responsible for the work and that a qualified replacement has been found who will assume responsibility.

2. The replacement civil engineer, soils engineer, or engineering geologist notifies the building official in writing that they have agreed to accept responsibility for the work.

4.7.4 Impacts and Mitigation Measures

This section describes the methodology used in conducting the CEQA impact analysis for geology and soils; the thresholds of significance used in assessing impacts to geology and soils; and the assessment of impacts to geology and soils, including relevant mitigation measures.

Methodology

The analysis in this section is largely based on the "Preliminary Soil and Geological Evaluation TerraVault 1 Carbon Capture Project" report prepared by Quad Knopf in October 2023. This section describes the potential geology and soils impacts associated with development of the project. This analysis first established baseline conditions for the affected environment relevant to geology and soils, as presented above in Section 4.7.2, *Environmental Setting.*

Thresholds of Significance

The County CEQA Implementation Document and Environmental Checklist state that a project would have a significant impact on geology and soils if it would:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - 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;
  - Strong seismic ground shaking;
  - Seismic-related ground failure, including liquefaction;
  - Landslides.
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Project Impacts

Impact 4.7-1: Directly or Indirectly Cause Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving the 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

Primary ground rupture is ground deformation that occurs along the surface trace of the causative fault during an earthquake. The proposed project would introduce structures and people to the project site and could therefore expose people and structures to seismic risks. The project site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone where site-specific studies addressing the potential for surface fault rupture are required; however, as described in Section 4.7.2, *Environmental Setting*, there are numerous earthquake faults in the vicinity of the project area. Both the San Andreas Fault Zone (approximately 14 miles to the west) and the White Wolf Fault (25 miles to the southeast), are major structural elements of California, with the San Andreas Fault Zone being mapped within State-designated Alquist-Priolo Earthquake Fault Zones as defined by Special Publication 42, published by the California Geological Survey. While unlikely, penetrations through the confining layers are possible, as are undetected, sub-seismic faults and fracture networks. Furthermore, while the project area is not located in an Earthquake Fault Zone presently mapped by the California Geological Survey, the site may contain unmapped faults not included in the USGS database.

The 1952 Kern County earthquake, the largest in the region, occurred southeast of Elk Hills near Frazier Park with an estimated magnitude of 7.5. Effects of the earthquake were catastrophic, with loss of life and significant property damage. Elk Hills has been closely monitored for the effects of seismicity by CRC and previous owners and operators of the field. The San Joaquin Valley is seismically active outside the field, but no basin-wide events have impacted the Elk Hills reservoirs and oil and gas infrastructure. This is due, in part, to the thickness and high level of clay in the primary confining layer Reef Ridge Shale. An earthquake may disturb surface and/or subsurface facilities, possibly resulting in loss, injury, or death.

In addition to direct damage to project structures, the level of seismic activity in the region potentially could result in CO_2 leakage from underground storage. However, though the Elk Hills oil field is in a seismically active region, only minor or inactive faults have been mapped in the Elk Hills oil field. The closest major active fault near Elk Hills is the San Andreas fault, located approximately 14.3 to 15.3 miles west of Elk Hills, and the closest minor active fault is the Buena Vista Fault approximately 5 miles to the south. No previous regional seismic events, including the 1952 Kern County earthquake, the largest in the region (estimated magnitude 7.5), have impacted the Elk Hills reservoirs and oil and gas infrastructure. See *Appendix E.1, Preliminary Soil and Geological Evaluation* and *Appendix E.2, U.S. Environmental Protection Agency Class VI Underground Injection Control (UIC) Permit Application Narratives for the Elk Hills 26R Storage Project and the A1A2 Storage Project.*

Induced seismicity as the result of CO_2 injection increasing underground pore pressure could also potentially disturb the storage formations and/or well integrity resulting in CO_2 leakage. There is no information currently available on such risks from CCS facilities comparable to the CTV I Project. The risk of CO_2 releases may be increased by the proximity of other plugged and abandoned wells whose integrity potentially could be disturbed by induced seismicity, although the risk also may be reduced by the lower pore pressure in oil and gas reservoirs that have been depleted by previous extraction. CO_2 releases unrelated to seismic risk have occurred from other types of industrial facilities, pipelines and well failures, as described in Chapter 4.9, *Hazards and Hazardous Materials* (Accidents, Upsets, and Safety Issues).

Without mitigation, this would be considered a potentially significant impact. However, as required by the EPA Class VI permit, CTV I will install and use continuous recording devices to monitor injection pressure, rate and volume, to ensure compliance with the allowable injection pressure, as well as testing and corrosion monitoring to ensure well integrity and monitoring water quality and geochemical changes above the confining zone. See Appendix E.2*, U.S. Environmental Protection Agency Class VI Underground Injection Control (UIC) Permit Application Narratives for the Elk Hills 26R Storage Project and the A1A2 Storage Project, Attachment C (Testing and Monitoring Plan).* In addition, under state law (SB 905) and California Air Resources Board requirements, seismic monitors and real time monitoring are required and CARB can shut down CO_2 injection if the monitoring detects increased seismicity or CO_2 leakage.

Impacts from seismic hazards are considered potentially significant without mitigation and MM 4.7-1 would be required to reduce these potential impacts to a less-than-significant level for this individual project impacts.

Mitigation Measures

MM 4.7 1 The owner/operator shall prepare a comprehensive seismic activity monitoring plan that includes, but is not limited to, connection to the Statewide seismic monitoring program of California Seismic Network (CISN). The draft plan shall be submitted concurrently to all the following agencies: Environmental Protection Agency, Region 9, California Seismic Network, California Air Resources Board and Kern County Public Works and Kern County Planning and Natural Resources. The final plan shall be approved by the California Air Resources Board and include all requirements of State law including but not limited to: Appropriate subsurface monitoring to ensure geologic sequestration of injected carbon dioxide; Identification of hazards and conditions that may require the suspension of carbon dioxide injections; notification protocols for all applicable agencies and emergency procedures. All requirements for seismic monitoring adopted by the California Air Resources Board – "Carbon Capture, Removal, Utilization and Storage Program" shall be implemented.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.7-2: Directly or Indirectly Cause Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving Strong Seismic Ground Shaking

As described in Section 4.7.2, *Environmental Setting*, the San Andreas Fault Zone is located approximately 14 miles to the west of the project site, and the White Wolf Fault is located 25 miles to the southeast of the project site. Some ground shaking is likely at the site during a major earthquake on one of the nearby faults. Based on the predicted maximum horizontal accelerations at the site and the soil types identified in the preliminary evaluation, ground failure was determined to be highly unlikely at the site. However, given the proximity of the project site to overall seismic activity in the region, structures on the project site may be subject to strong ground shaking, which may result in structural damage. Structural damage to the facilities, overhead transmission lines, and other project components could potentially injure workers at the project site. Therefore, this impact is considered potentially significant. Mitigation of strong ground shaking, when needed, is typically provided by designing structures in accordance with the latest edition of the California Building Code.

Injection of fluids into deep geologic formations has the potential to cause fluid pressure buildup within fault zones, leading to an increase in seismic activity. Natural and induced seismic events have the potential to affect injection and monitoring wells and equipment. Because there are no known major faults within the project area, it is not expected for the proposed project activities to increase seismic activity or for seismic activity to impact proposed project activities or facilities. Based on the project operating conditions, it is unlikely that injection operations would induce a seismic event outside the area of review. The response plan from the Class VI Permit Application has a section covering seismic events with an epicenter within the area of review, inclusive of a 2-mile buffer, or natural events that have the potential to cause disruption to project operations.

Mitigation Measures

Implement MM 4.7-1, as described above.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.7-3: Directly or Indirectly Cause Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving Seismic-related Ground Failure, Including Liquefaction

As noted above, there are no mapped areas that have Seismic Hazard Zones for liquefaction or landslides within the project area. Nevertheless, impacts from seismic-related ground failure would be considered potentially significant, and MM 4.7-1 would be required to reduce these potential impacts to a less-than-significant level.

Mitigation Measures

Implement MM 4.7-1, as described above.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.7-4: Directly or Indirectly Cause Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving Landslides

Strong shaking has the potential for activating landslides on hillsides; slope failures on creek banks; and tension cracking in areas underlain by loose, low-density soil, such as extensive fill. As noted under Impact 4.7-2, some ground shaking is likely at the site in the event of a major earthquake on one of the nearby faults. There are no known areas of extensive fill at the site and based on the predicted maximum horizontal accelerations at the site and the soil types identified in the preliminary report, ground failure was determined to be highly unlikely at the site. As indicated above, no evidence of historic landslides or creep was observed within the project areas, and there is a low-to-moderate potential for rockfalls or landslides to impact the site in the event of a major earthquake. Therefore, the potential for landslides or other slope failures from earthquake-induced ground shaking in these areas is considered low.

During construction of the project, destabilization of natural or constructed slopes could occur as a result of excavation and/or grading activities. Unmapped landslides and areas of localized slope instability may also be encountered. Excavation operations associated with facility construction and grading operations for temporary and permanent access roads and construction activities in areas of hilly or sloping terrain could result in slope instability, landslides, soil creep, or debris flows. Geotechnical studies conducted during final siting of project infrastructure would identify site-specific geologic conditions, to be considered in infrastructure siting. Impacts from hazards associated with landslides would be potentially significant, and MM 4.7-2 would be required.

Mitigation Measures

MM 4.7-2 Operators shall not site wells or accessory equipment and facilities on slopes greater than 30%.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.7-5: Result in Substantial Soil Erosion or the Loss of Topsoil

Excavation and grading for facility installation, work areas, and access roads could loosen on-site soils or remove stabilizing vegetation and expose areas of loose soil. These areas, if not properly stabilized during construction, could be subject to increased soil loss and erosion by wind and storm water runoff. As described in Section 4.7.2, *Environmental Setting*, soils at the project site are generally comprised of silty sand to clayey sand loams. Within the project site, erosion is an ongoing process that would continue primarily within existing drainage features where periodic flooding and sedimentation occur during and following periods of intense rainfall. As noted above, erosional drainage features were observed along or adjacent to some of the existing as well as to the proposed pipelines. Therefore, erosion is possible within or adjacent to stream channels and

washes; however, as described in Section 4.10, *Hydrology and Water Quality*, the placement of project infrastructure as proposed is not expected to result in substantial erosion related to storm water runoff.

In compliance with the CWA, as well as regulations of the State Water Resources Control Board, a SWPPP, which includes site-specific BMPs for erosion and sediment control, would be prepared and implemented for the project.

Prior to the issuance of any grading permit, the project proponent is required to submit a plan, prepared by a registered civil engineer or other professional, for the mitigation of potential soil erosion and sedimentation and submit it to the director of the Engineering, Surveying, and Permit Services Department for review and approval. At a minimum, the plan is required to include:

- Provisions for site revegetation, including any necessary re-soiling
- Proposed plant species
- Proposed plant density and percentage of ground coverage
- The methods and rates of plant seed application
- Sediment collection facilities.

Furthermore, the soil erosion and sedimentation control plan is to be consistent with the applicable requirements of the Regional Water Quality Control Board pertaining to the project's SWPPP.

In addition to the above, the revegetation portion of the soil erosion and sedimentation plan would be required to be prepared by a professional biologist or other professional and approved prior to review and approval of the soil erosion and sedimentation plan by the County Engineering, Surveying, and Permit Services Department. The plan would include a timetable for full plan implementation, estimated costs, and a surety bond or other security as approved by the Engineering, Surveying, and Permit Services Department in an amount determined to guarantee plan implementation. The security would remain on file with the Engineering, Surveying, and Permit Services Department until the Department has verified that the plan has been successfully implemented.

Mitigation Measures

The project would implement stormwater mitigation measures, as described in Section 4.10, *Hydrology and Water Quality*.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.7-6: 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

As noted above, the estimated depth to groundwater at the project site is greater than 100 feet below ground surface, and the soils mapped at the project site consist of silty sand to clayey sand loams. There are no mapped areas that have Seismic Hazard Zones for liquefaction or landslides within the project area. There is a low-to-moderate potential for rockfalls or landslides to impact the site in the event of a major earthquake.

As previously discussed, lateral spreading typically occurs adjacent to free faces, such as slopes and creek channels. Considering the general topography of the terrain and the absence of liquefaction, the potential for lateral spreading to occur on the project site would be low.

Seismically induced settlement is dependent on the relative density of the subsurface soils. Most of the older alluvial soils are very dense, and the potential for these materials to settle due to seismic shaking is very low. The younger, looser soils would possibly have the greatest potential for seismically induced settlement.

Soil volume changes can occur when expansive soils undergo alternating cycles of wetting (swelling) and drying (shrinking). Some of the soils in the project area have a clay fraction and may be expansive. Therefore, soils on the project site exhibit probability for shrink–swell patterns, or expansive characteristics. The design-level geotechnical investigation would determine the expansive potential of the underlying soil at the project site and any mitigation measures required. The geotechnical investigation for soils at the project site would be conducted prior to final design and approval of the project and would be used in determining final siting of project infrastructure.

As described above, seismic-related ground failure may result in surface rupture near or on the project site. Such event(s) could potentially result in damage to project facilities/structures, introducing the potential to subsequently result in on- or off-site landslide, liquefaction, or collapse. To avoid such an occurrence, a geotechnical evaluation would be required to avoid locating project infrastructure on unstable or potentially unstable geologic units or soils.

Mitigation Measures

MM 4.7-3 The Owner/operator shall implement all requirements of a site-specific geotechnical report.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.7-7: Be Located on Expansive Soil, as Defined in Table 18-1-B of the Uniform Building Code (1994), Creating Substantial Risks to Life or Property

As discussed above, the project site soils may be expansive. As previously noted, a geotechnical investigation for soils at the project site would be conducted prior to final design and approval of the project and would be used in determining final siting of project infrastructure. This impact is therefore considered to be potentially significant, and implementation of MM 4.7-4 is required to reduce impacts to a less-than-significant level.

Mitigation Measures

MM 4.7-4 The Owner/operator s shall avoid building infrastructure on expansive soil, unless the Owner/operator determines that CCS injection facilities are infeasible from a different location, and site-specific Professional Engineering certification is submitted concluding that the new equipment will not cause substantial risks to life or property. The site-specific professional engineering certification must be submitted and reviewed by the Kern County Public Works Department and a memo provided that agrees that construction and operation of new equipment will not cause substantial risks to life or property as determined through established engineering standards. All recommendations required by the approved engineering certification from Kern County Public Works shall be implemented.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.7-8: Have Soils Incapable of Adequately Supporting the Use of Septic Tanks or Alternative Wastewater Disposal Systems Where Sewers Are Not Available for the Disposal of Wastewater

Development of septic systems or alternative wastewater disposal systems are not proposed as a part of the project. No impact would occur.

Mitigation Measures

No mitigation measures are required.

Level of Significant

No impact would occur.

Impact 4.7-9: Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature, as Defined in CEQA Guidelines Section 15064.

The high paleontological potential of the Tulare Formation suggests that construction of the proposed project may result in impacts to paleontological resources, as indicated in the Paleontological Records Search conducted by SDNHM (Appendix E-4). Any proposed excavation

activities that extend deep enough to encounter previously undisturbed strata of this geologic unit (i.e., grading, borehole auguring, trenching, or other miscellaneous excavations that extend below the depth any previously imported artificial fill or disturbed sediments present within the project area) have the potential to impact the paleontological resources preserved therein. If encountered, disturbance of significant fossils would result in a potentially significant impact to paleontological resources. However, with implementation of MM 4.7-5 through MM 4.7-6, which would require Paleontological Resources Awareness Training for construction workers, use of a qualified paleontological monitor during construction activities, and appropriate treatment of accidentally uncovered paleontological resources, impacts to paleontological resources would be reduced to less than significant.

Mitigation Measures

MM 4.7-5 As part of any Worker Environmental Awareness Program training, all construction personnel shall be trained regarding the recognition of possible uncovered paleontological resources and protection of paleontological resources during construction, prior to the initiation of construction or ground-disturbing activities. Training shall inform construction personnel of the procedures to be followed upon the discovery of paleontological materials. All personnel shall be instructed that unauthorized collection or disturbance of fossils is unlawful.

MM 4.7-6 Prior to commencement of any work on project wells, capture facilities or facility pipeline a mitigation fee of $10,000 shall be paid to the Buena Vista Museum to fund the continued education and curation of paleontological resources and provide educational support regarding the paleontological history of the region.

Level of Significance after Mitigation

Impacts would be less than significant.

4.7.5 Cumulative Setting Impacts and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; an SREIR certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas

development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production county wide over 25 years of 3,649 new wells countywide per year of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, SB 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1200 per year) since February 2021. The California Geologic Energy Management Division (CalGEM) permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to geology and soils is considered the entire known and potential areas of geographic reservoirs that could be permitted to store CO_2. Those reservoirs have been identified theoretically in the Lawrence Livermore National Lab Report "Getting to Neutral; Options for Negative Carbon Emissions in California" (Stark 2020). The State of California Department of Conservation Geologic Carbon Sequestration Group is undertaking further delineation to identify a variety of sites in California. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on geology, specifically seismic activity and soils reservoir.

Impact 4.7-10: Contribute to Cumulative Geologic and Soils Impacts

With regard to the project's potential to expose people or structures to hazards associated with the rupture of a known earthquake fault or from strong seismic ground shaking (Impacts 4.7-1 and 4.7-2), damage to associated project facilities could occur from direct rupture of a fault in the project site. During such an earthquake, structural damage to associated facilities from the project could potentially injure workers at the site. The project would implement MM 4.7-1, which requires the preparation of a comprehensive seismic activity monitoring plan, thus reducing the project's impacts.

With regard to the project's potential to expose people or structures to hazards associated with seismic-related ground failure, including liquefaction (Impact 4.7-3), it is possible that ground rupture and/or failure could occur in the project site through cumulative impacts from the future CCS projects in the San Joaquin Valley and specifically the county and that such an event could result in damage to project infrastructure and potentially those located off site. MM 4.7-1 requires

a comprehensive seismic monitoring and management plan that includes, but is not limited to, appropriate subsurface monitoring to ensure geologic sequestration of injected CO_2; identification of hazards and conditions that may require the suspension of CO_2 injections; and notification protocols for all applicable agencies and emergency procedures. All requirements for seismic monitoring adopted by CARB – "Carbon Capture, Removal, Utilization and Storage Program" shall also be implemented.

Connection to the CISN statewide seismic monitoring program is a requirement of SB 905, and all projects would be required to connect. The CISN program would be able to detect even small seismic events for all CCS projects and evaluate the significance of those events individually and cumulatively and recommend to the CARB that injection be paused. Leak detection monitoring is also required at the injection well sites as well as a comprehensive monitoring well system. Evaluations of the project from even very small earthquake events that cannot be felt by surrounding communities would be detected, reported, and evaluated against any potential leakage detected. As noted in the evidence in the record on seismic activities related to oil and gas exploration and extraction, Chapter 4.6, *Geology and Soils*, of the Kern County Oil and Gas EIR, project activities of hydraulic fracturing and deep wastewater injection have limited potential to induce seismic activities. There are no cases where strong seismic shaking (>4.0) have occurred as a result of induced seismicity. In California, there is limited case history with respect to induced seismicity form hydraulic fracturing or historical wastewater injection. Neither of these activities would be authorized within the project boundary. The National Academy of Sciences found that the "potential for felt seismicity due to secondary recovery and EOR [enhanced oil recovery] is low" and that hydraulic fracturing as presently implemented "does not pose a high risk for induced felt seismic events in California" (NAS 2013). EOR is prohibited by SB 905 to be conducted on the CCS site or for the CO_2 collected and injected to be used anywhere for EOR. In addition, the California Council on Science and Technology concluded current hydraulic fracturing activity is not considered to pose a significant seismic hazard in California (CCST 2014). Under directions from the governor's office, CalGEM has ceased processing and issuing permits for hydraulic fracturing since April 2021 and was directed to create regulations to end all permitting for such well treatments in January 2024. The matter is under ligation. CalGEM regulates the operation of injection wells to minimize effects on people. Over-pressuring of injected zones is controlled by operating all injections wells under State permitting control according to California Code of Regulations Title 14, Division 2, Chapter 4, Subchapter 1, Article 3 Requirements. The UIC Class VI wells for this project would in similar fashion be managed by the U.S. Environmental Protection Agency to prevent over-pressuring the zones.

Although there is no evidence in the record that the cumulative impacts of current oil and gas activities are causing significant, strong seismic events, the conclusions for seismic activity for injection on CO_2 into formations for multiple CCS projects in the same county is based on science modeling and has not been validated in real world projects. The CISN has over 23 years of experience with the detection and reporting of seismic events. The monitoring equipment has progressed to a sensitivity stage where the Statewide Early Warning System can detect that an earthquake is starting and send an alert to cell phones seconds before it occurs (Burkett et al. 2014). Such detection can ensure that injection activities could be stopped in anticipation of an event as well if needed. The issue of induced seismicity while understood and modeled contains uncertainty

for multiple active projects. Other CCS projects in the region would be evaluated under CEQA with individual site-specific EIRs and individual UIC permitting to ensure the area of review is appropriate with limits on quantities and characteristics of the CO_2 injected. However, due to the uncertainty of the implementation of multiple projects and the ability to simultaneously cease injection during an event, the impacts from cumulative induced seismic activity from this project plus any future permitted CCS project is significant and unavoidable, even with the monitoring and actions of MM 4.7-1 and there are no other feasible and reasonable mitigations available.

Mitigation Measures

Implement MM 4.7-1 to MM 4.-7-6, as described above.

Level of Significance after Mitigation

Cumulative impacts for potential induced seismic activity are significant and unavoidable.

With regard to the project's potential to expose people or structures to hazards associated with landslides, strong shaking has the potential for activating landslides on hillsides; slope failures on creek banks; and tension cracking in areas underlain by loose, low-density soil (Impact 4.7-4). During construction of the project, destabilization of natural or constructed slopes could occur as a result of excavation and/or grading activities. The project would implement MM 4.7-2, where wells and accessory equipment shall not be sited on slopes greater than 30 percent, thus reducing any associated impacts. Additionally, none of the cumulative projects identified in Section 3.9, *Cumulative Projects*, are located on the portions of the project site that consist of steep slopes. Therefore, project impacts would not have the potential to combine with similar impacts of past, present, or reasonably foreseeable projects to result in a cumulative impact. The cumulative projects listed in Section 3.9, *Cumulative Projects*, would be required to comply with the goals, policies, and implementation measures of applicable laws, regulations, and required standards. Should potential geologic- and soil-related impacts be identified, compliance with applicable legal requirements is required, and additional mitigation could also be required for cumulative projects subject to CEQA or the National Environmental Policy Act.

Mitigation Measures

Implement **MM 4.7-1 through MM 4.7-6**, as described above**.**

Level of Significance after Mitigation

Cumulative impacts would be less than significant.

With regard to the project's potential to result in substantial soil erosion or loss of topsoil (Impact 4.7-5), erosion is an ongoing process that would continue primarily within existing drainage features. As previously detailed, erosional drainage features were observed along or adjacent to some of the existing as well as to the proposed pipelines. The placement of project infrastructure as proposed would not be expected to result in substantial erosion related to storm water runoff. The project would be required to implement a SWPPP, which would include site-specific BMPs

for erosion and sediment control, reducing potential cumulative impacts to a less-than-significant level.

Mitigation Measures

The project would implement stormwater mitigation measures, as described in Section 4.10, *Hydrology and Water Quality*.

Level of Significance after Mitigation

Cumulative impacts would be less than significant.

With regard to the project's potential to place infrastructure on soil that is unstable or expansive (Impacts 4.6-7 and 4.7-7), the soils on site may be expansive soils. Implementing MM 4.7-3 and MM 4.7-4 would reduce this potential impact to less-than-significant levels. Geotechnical assessments at the project site would be conducted prior to construction to ensure that soils are suitable for the placement of project infrastructure. Therefore, these impacts would not have the potential to combine with similar impacts of past, present, or reasonably foreseeable projects to result in a cumulative impact.

Mitigation Measures

Implement MM 4.7-1 to MM 4.7-6, as described above.

Level of Significance after Mitigation

Cumulative impacts would be less than significant.

With regard to the project's potential to be located on soils incapable of adequately supporting the use of septic tanks (Impact 4.7-8), the project does not propose to implement any new septic systems. As such, any existing infrastructure would comply with applicable requirements of the Kern County Public Health Services Department. Therefore, these impacts would not have the potential to combine with similar impacts of past, present, or reasonably foreseeable projects to result in a cumulative impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Cumulative impacts would be less than significant.

With regard to the project's impacts to unique paleontological resources (Impact 4.7-9), the project would not contribute significantly to cumulative impacts within the region. Paleontological resources are generally not considered subject to cumulative impacts because they are localized and site-specific and are either individually impacted in a way that changes the significance of the resource or are avoided, including in the Tulare Formation.

Although significant fossils may be discovered during excavation for construction, through implementation of MM 4.7-5 through MM 4.7-6, direct impacts to paleontological resources would be reduced to a level that is less than significant. Paleontological resources are generally not considered subject to cumulative impacts because they are localized and site-specific and are either individually impacted in a way that changes the significance of the resource or are avoided. In addition, the other projects identified in Section 3.9, *Cumulative Projects*, would also be expected to reduce potential impacts on paleontological resources to a less-than-significant level through avoidance or mitigation and, therefore, would not contribute to a significant cumulative impact. Therefore, impacts of the project would not have the potential to combine with impacts from past, present, or reasonably foreseeable projects to result in a cumulative impact to paleontological resources and cumulative impacts would be less than significant.

Mitigation Measures

Implement MM 4.7-1 to MM 4.7-6 as described above.

Level of Significance after Mitigation

Cumulative impacts would be less than significant.

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Section 4.8

Greenhouse Gas Emissions

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Section 4.8

Greenhouse Gas Emissions

4.8.1 Introduction

This section describes the affected environment and regulatory setting for greenhouse gas (GHG) emissions and global climate change. It also describes the impacts on GHG that would result from implementation of California Resources Corporation's (project proponent, or CRC) proposed Carbon TerraVault (Kern County) 1 Project (project). The project site is a specific set of parcels within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself (see Chapter 3.0, *Project Description*). Elk Hills is located 26 miles southwest of Bakersfield approximately 8.5 miles from the City of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

Information contained within this section was primarily provided by the Air Quality Impact Analysis, dated May 2023, which was prepared by Trinity Consultants and included as Appendix B-1 of this Draft Environmental Impact Report (EIR).

A description of the environmental setting (affected environment) for GHG and Global Climate Change is presented below in Section 4.8.2, *Environmental Setting*. The regulatory setting applicable to GHG-related impacts is presented in Section 4.8.3, *Regulatory Setting*, and Section 4.2.4, *Impacts and Mitigation Measures,* discusses project impacts and associated Mitigation Measures.

4.8.2 Environmental Setting

GHGs and climate change are a cumulative global issue. The California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (EPA) regulate GHG emissions within the State of California and the United States, respectively. While CARB has the primary regulatory responsibility within California for GHG emissions, local agencies can also adopt policies for GHG emission reduction. CARB has divided California into regional air basins. The project is located within Kern County's (County's) portion of the San Joaquin Valley Air Basin (SJVAB). Kern County is included among the eight counties that make up the San Joaquin Valley Air Pollution Control District (SJVAPCD).

Climate

The most significant single control on the weather pattern of the San Joaquin Valley is the semi-permanent subtropical high-pressure cell, referred to as the "Pacific High." During the summer, the Pacific High is positioned off the coast of northern California, diverting ocean-derived storms to the north. Hence, the summer months are virtually rainless. During the winter, the Pacific High moves southward allowing storms to pass through the San Joaquin Valley. Almost all of the precipitation expected during a given year occurs from December through April. During the summer, the predominant surface winds are out of the northwest. Air enters the Valley through the

Carquinez strait and flows toward the Tehachapi Mountains. This up-valley (northwesterly) wind flow is interrupted in early fall by the emergence of nocturnal, down-valley (southeasterly) winds which become progressively more predominant as winter approaches. Wind speeds are generally highest during the spring and lightest in fall and winter. The relatively cool air flowing through the Carquinez strait is warmed on its journey south through the Valley. On reaching the southern end of the Valley, the average high temperature during the summer is nearly 100 degrees Fahrenheit (°F). Relative humidity during the summer is quite low, causing large diurnal temperature variations. Temperatures during the summer often drop into the upper 60s. In winter, the average high temperatures reach the mid-50s and the average low drops to the mid-30s. In addition, another high-pressure cell, known as the "Great Basin High," develops east of the Sierra Nevada Mountain Range during winter. When this cell is weak, a layer of cool, damp air becomes trapped in the basin and extensive fog results. During inversions, vertical dispersion is restricted, and pollutant emissions are trapped beneath the inversion and pushed against the mountains, adversely affecting regional air quality. Surface-based inversions, while shallow and typically short-lived, are present most mornings. Elevated inversions, while less frequent than ground-based inversions, are typically longer lasting and create more severe air stagnation problems. The winter season characteristically has the poorest conditions for vertical mixing of the entire year.

Meteorological data for various monitoring stations is maintained by the Western Regional Climate Center. Meteorological data for the project site is expected to be similar to the data recorded at the Buttonwillow monitoring station. This data is provided in Table 4.8-1, which contains average precipitation data recorded at the Buttonwillow monitoring station. Over the 115-year period from January of 1901 through June of 2016 (the most recent data available), the average annual precipitation was 5.64 inches (WRCC 2023).

Table 4.8-1: Buttonwillow Weather Data

Period of Record Monthly Climate Summary for the Period 01/05/1901 to 6/10/2016													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Maximum Temp (F)	56.4	63.2	69.1	76.0	84.7	92.4	98.4	96.7	91.7	81.4	67.4	57.2	77.9
Avg. Minimum Temp (F)	35.2	39.0	43.0	47.2	54.1	60.1	65.3	63.3	57.9	48.8	39.2	34.5	49.0
Average Total Precipitation (in.)	1.06	1.07	0.97	0.55	0.21	0.05	0.02	0.02	0.12	0.27	0.55	0.75	5.64
Average Snowfall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent of possible observations for period of record: Max. Temp.: 99.1% Min. Temp.: 99.1% Precipitation: 98.8% Snowfall: 99.2% Snow Depth: 99.2%													
Source: Western Regional Climate Center, 2023.													

Global Climate Change

"Global climate change," often used interchangeably with "global warming," refers to change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms, lasting for decades or longer. Climate change may result from the following influences:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- Natural processes within the climate system (e.g., changes in ocean circulation)
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, and desertification)

As determined from worldwide meteorological measurements between 1990 and 2005, the primary observed effect of global climate change has been a rise in the average global tropospheric temperature of 0.36°F per decade. Climate change modeling shows that further warming could occur, which could induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include higher sea levels, drier or wetter weather, changes in ocean salinity, changes in wind patterns or more energetic aspects of extreme weather (e.g., droughts, heavy precipitation, heat waves, extreme cold, and increased intensity of tropical cyclones). Specific effects from climate change in California may include a decline in the Sierra Nevada snowpack, erosion of California's coastline, and seawater intrusion in the Sacramento-San Joaquin River Delta.

Human activities, including fossil fuel combustion and land use changes, release carbon dioxide (CO_2) and other compounds cumulatively termed GHGs. GHGs are effective at trapping radiation that would otherwise escape the atmosphere. This trapped radiation warms the atmosphere, the oceans, and the earth's surface. Many scientists believe "most of the warming observed over the last 50 years is attributable to human activities". The increased amount of CO_2 and other GHGs in the atmosphere is the alleged primary result of human-induced warming.

Greenhouse Gases

Constituent gases that trap heat in the earth's atmosphere are called GHGs, analogous to the way a greenhouse retains heat. GHGs play a critical role in earth's radiation budget by trapping infrared radiation emitted from the earth's surface, which would otherwise escape into space. Without the natural heat-trapping effect of GHGs, the earth's surface would be about 34°F cooler (CAT 2006). This natural phenomenon, known as the "greenhouse effect," is therefore responsible for maintaining a habitable climate.

The standard definition of GHGs includes six substances identified in the Kyoto Protocol – CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—plus chlorofluorocarbons (CFCs) and other chlorine or bromine-containing gases phased out under the Montreal Protocol.

Some GHGs, including CO_2, CH_4, and N_2O, are present in the atmosphere naturally, released by natural sources, or formed from secondary reactions taking place in the atmosphere. In the last 200 years, substantial quantities of GHGs have been released into the atmosphere, primarily from fossil fuel combustion. These human-induced emissions are increasing GHG concentrations in the atmosphere, therefore enhancing the natural greenhouse effect. The GHGs resulting from human activity are believed to be causing global climate change. From the pre-industrial era (i.e., ending about 1750) to 2021, concentrations of CO_2, CH_4, and N_2O have increased globally by 48.1, 170.8, and 23.8 percent, respectively (EPA 2023a). While human made GHGs include naturally present substances like CO_2, CH_4, and N_2O, some (like CFCs) are completely new to the atmosphere.

GHGs vary considerably in terms of global warming potential (GWP), the comparative ability of each GHG to trap heat in the atmosphere. The GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and the length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to CO_2, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of "CO_2 equivalents" (CO_2e).

The principal GHGs resulting from human activity that enter and accumulate in the atmosphere are described below.

- **Carbon Dioxide (CO_2)** is a colorless, odorless gas consisting of molecules made up of two oxygen atoms and one carbon atom. CO_2 is produced when an organic carbon compound (such as wood) or fossilized organic matter, (such as coal, oil, or natural gas) is burned in the presence of oxygen. CO_2 is removed from the atmosphere by CO_2 "sinks," such as absorption by seawater and photosynthesis by ocean-dwelling plankton and land plants, including forests and grasslands. However, seawater is also a source of CO_2 to the atmosphere, along with land plants, animals, and soils, when CO_2 is released during respiration. Whereas the natural production and absorption of CO_2 is achieved through the terrestrial biosphere and the ocean, humankind has altered the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid-1700s, each of these activities has increased in scale and distribution.
- **Methane (CH_4)** is a colorless, odorless nontoxic gas consisting of molecules made up of four hydrogen atoms and one carbon atom. CH_4 is combustible, and it is the main constituent of natural gas—a fossil fuel. CH_4 is also released when organic matter decomposes in low oxygen environments. Natural sources include wetlands, swamps and marshes, termites, and oceans. Human sources include the mining of fossil fuels and transportation of natural gas, digestive processes in ruminant animals such as cattle, rice paddies, and the buried waste in landfills. Over the last 50 years, human activities, such as growing rice, raising cattle, using natural gas, and mining coal, have added to the atmospheric concentration of CH_4. Other anthropogenic sources include fossil-fuel combustion and biomass burning.

- **Nitrous Oxide (N_2O)** is a colorless, non-flammable gas with a sweetish odor, commonly known as "laughing gas," and sometimes used as an anesthetic. N_2O is naturally produced in the oceans and in rainforests. Man-made sources of N_2O include the use of fertilizers in agriculture, nylon and nitric acid production, cars with catalytic converters and the burning of organic matter. Concentrations of N_2O also began to rise at the beginning of the industrial revolution.
- **Chlorofluorocarbons (CFCs)** are gases formed synthetically by replacing all hydrogen atoms in CH_4 or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically un-reactive in the troposphere (the level of air at the earth's surface). CFCs have no natural source but were first synthesized in 1928. They were used for refrigerants, aerosol propellants, and cleaning solvents. Because of the discovery that they are able to destroy stratospheric ozone, an ongoing global effort to halt their production was undertaken and has been extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.
- **Sulfur Hexafluoride (SF_6)** is an extremely potent GHG. SF_6 is very persistent, with an atmospheric lifetime of more than a thousand years. Thus, a relatively small amount of SF_6 can have a significant long-term impact on global climate change. SF_6 is human-made, and the primary user of SF_6 is the electric power industry. Because of its inertness and dielectric properties, it is the industry's preferred gas for electrical insulation, current interruption, and arc quenching (to prevent fires) in the transmission and distribution of electricity. SF_6 is used extensively in high-voltage circuit breakers and switchgear, and in the magnesium metal casting industry.
- **Hydrofluorocarbons (HFCs)** are synthesized chemicals that are used as a substitute for CFCs. Out of all of the GHGs, HFCs are one of three groups with the highest GWP. HFCs are synthesized for applications such as automobile air conditioners and refrigerants.
- **Perfluorocarbons (PFCs)** have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. Because of their molecular stability, PFCs have very long lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Greenhouse Gas Emissions Inventories

The EPA releases an annual GHG inventory that tracks U.S. GHG emissions and sinks by source, economic sector, and GHG going back to 1990. In 2021, U.S. GHG emissions totaled 6,340.2 million metric tons (MMT) of CO_2e, or 5,586.0 MMT CO_2e after accounting for sequestration (i.e., also referred to as "storage"; these terms are used synonymously throughout the regulatory landscape) from the land sector. Overall, net emissions increased 6.4% from 2020 to 2021 and decreased 16.6% from 2005 levels. In 2021, CO_2 emissions from fossil fuel combustion were 4,639.1 MMT CO_2e, or 1.9 percent below emissions in 1990. The transportation sector accounted for 28 percent of 2021 GHG emissions, the electric power industry accounted for 25 percent, the industrial sector accounted for 23 percent, commercial and residential accounted for 13 percent, and agriculture accounted for 10 percent (EPA 2023a).

CARB is responsible for developing and maintaining the California GHG emissions inventory. This inventory estimates the amount of GHG emitted into and removed from the atmosphere by human activities within the state of California and supports the Assembly Bill (AB) 32 Climate Change Program. CARB's current GHG emission inventory covers the years 2000 through 2020 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, and agricultural lands).

In 2020, statewide GHG emissions (in-state sources and imported electricity) were 369.2 MMT CO_2e, which is 35.3 MMT CO_2e lower than 2019 levels and 61.8 MMT CO_2e below the 2020 GHG Limit of 431 MMT CO_2e (CARB 2022a). Per capita GHG emissions in California have decreased 33% from a 2001 peak of 13.8 metric tons (MT) per person to 9.3 MT per person in 2020. CARB noted that the 2019 to 2020 decrease in emissions is likely due in large part to the impacts of the COVID-19 pandemic and economic recovery may result in emissions increases over the next few years. As such, the total 2020 reported emissions are likely an anomaly, and any near-term increases in annual emissions should be considered in the context of the pandemic.

CARB's inventory shows that the transportation sector was the source of approximately 37 percent of California's GHG emissions in 2020, followed by industrial sources at 20 percent and electricity generation at 16 percent. Other sources of GHG emissions were residential plus commercial activities at 11 percent, agriculture at 9 percent, high global warming potential gases at 6 percent, and recycling and waste at 2 percent (CARB 2022a).

Effects of Global Climate Change

Changes in the global climate are assessed using historical records of temperature changes that have occurred in the past to extrapolate a level of statistical significance specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from past climate changes in rate and magnitude.

Several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts were constructed by the Intergovernmental Panel on Climate Change (IPCC). In the IPCC Fifth Assessment Report, it was predicted that the global mean temperature change from 1990 to 2100 could range from 1.1 degree Celsius (°C) to 6.4 °C (8 to 10.4 °Fahrenheit). Under all scenarios, global average temperatures and sea levels are expected to rise. It was concluded that global climate change was largely the result of human activity, mainly the burning of fossil fuels.

Effects from global climate change may arise from temperature increases, climate sensitive diseases, extreme weather events, and degradation of air quality. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems. Heat-related problems include heat rash and heat stroke, drought, etc. In addition, climate-sensitive diseases may increase, such as those spread by mosquitoes and other disease-carrying insects. Such diseases include malaria, dengue fever, yellow fever, and encephalitis. People and agriculture can be displaced by extreme events such as flooding and hurricanes. Air

quality problems may also result from global warming due to an increased frequency of smog and particulate air pollution.

It was concluded that several climate change effects can be expected in California over the course of the next century by the 2006 California Climate Action Team (CAT) Report. Trends established by the IPCC that the CAT used to make this prediction are detailed in the Air Quality Impact Analysis (Appendix B-1), including but not limited to: a diminishing Sierra snowpack, a rise in sea levels, an increase in temperature and extreme weather events, an increased risk of large wildfires, an increase in forest vulnerability, a reduction in the quality and quantity of agricultural products, an exacerbation of air quality problems, a decrease in the health and productivity of California forests, an increase in electricity demand, and an increase in ground-level ozone formation.

4.8.3 Regulatory Setting

In 1988, the IPCC was established to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, an agreement with the goal of controlling GHG emissions was established by the United Nations Framework Convention on Climate Change. As a result, the Climate Change Action Plan was developed to address the reduction of GHGs in the United States. The plan consists of more than 50 voluntary programs. Additionally, the Montreal Protocol was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere (CFCs, halons, carbon tetrachloride, and methyl chloroform) were phased out by 2000 (methyl chloroform was phased out by 2005).

In addition to these voluntary commitments and programs, many regulations have been adopted at the federal, state, and local levels to quantify and reduce GHG emissions. Descriptions of those relevant to the project are presented in the following sections.

Although global warming and climate change have received substantial public attention for more than 20 years, the analytical tools have not been developed to determine the effect on worldwide global warming from a particular increase in GHG emissions, or the resulting effects on climate change in a particular locale. The scientific tools needed to evaluate the impacts that a specific project may have on the environment are even farther in the future.

Federal

U.S. Environmental Protection Agency

The principal air quality regulatory mechanism at the federal level is the Clean Air Act (CAA) and in particular, the 1990 amendments to the CAA and the National Ambient Air Quality Standards that it establishes. The EPA is responsible for implementing federal policy to address GHGs. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA. The EPA adopted a Final Endangerment Finding for the six defined GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6), which was required before the EPA could regulate GHG emissions under Section 202(a)(1) of the CAA. The EPA also adopted a Cause or Contribute

Finding in which the EPA Administrator found that GHG emissions from new motor vehicle and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. These findings do not themselves impose any requirements on industry or other entities. However, these actions were a prerequisite for implementing GHG emissions standards for vehicles. There are currently no federal regulations that set ambient air quality standards for GHGs.

Mandatory Reporting of Greenhouse Gases Rule (40 CFR Part 98)

This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 MT CO_2e emissions per year (40 Code of Federal Regulations [CFR] Part 98). The project would not be expected to trigger GHG reporting according to the rule.

Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule (40 CFR Part 52)

GHG emissions from the largest stationary sources were, for the first time, covered by the Prevention of Significant Deterioration (PSD) and Title V Operating Permit Programs beginning on January 2, 2011. The EPA's GHG Tailoring Rule, issued in May 2010, established a commonsense approach to permitting GHG emissions under PSD and Title V. In June 2014, the U.S. Supreme Court ruled that the EPA cannot classify a facility as a major PSD or Title V source based solely on its GHG emissions meeting the major source threshold. However, the Supreme Court said that the EPA could continue to require that PSD permits, required due to criteria pollutant emissions, contain limitations on GHG emissions based on the application of Best Available Control Technology (EPA 2023b). The project would not be expected to trigger PSD permitting as required by this regulation.

National Climate Action Plan

In 2021, EPA released its "US EPA's Climate Action Plan: October 2021" in response to Executive Order (EO) 14008 (EPA 2021). EO 14008, entitled "Tackling the Climate Crisis at Home and Abroad" (January 2021) calls for a government-wide approach to the climate crisis that reduces climate pollution in every sector of the economy; increases resilience to the impacts of climate change; protects public health; conserves our lands, waters, and biodiversity; delivers environmental justice; and spurs well-paying jobs and economic growth, especially through innovation, commercialization, and deployment of clean energy technologies and infrastructure. The EPA intends to formalize its policy on adaptation with the revision of Department Manual Part 523 – Climate Change Adaptation. The policy will provide guidance to Bureaus and Offices for addressing climate change impacts on the EPA's mission, programs, operations, and personnel.

Fuel Efficiency Standards for Construction Equipment

The federal government sets fuel efficiency standards for non-road diesel engines that are used in construction equipment. The regulations, contained in 40 CFR Parts 1039, 1065, and 1068, include multiple tiers of emission standards. Most recently, the EPA adopted a comprehensive national program to reduce emissions from non-road diesel engines by integrating engine and fuel controls

as a system to gain the greatest reductions. To meet these Tier 4 emission standards, engine manufacturers will produce new engines with advanced control technologies.

Oil and Natural Gas Air Pollution Standards (40 CFR Parts 60 and 63):

Air pollution standards established by the EPA under the New Source Performance Standard, Final Rule August 16, 2012, for oil and gas production require companies to provide notifications of oil and natural gas well completions. Amendments effective August 2, 2016, include standards for GHG emissions (in the form of limitations on CH_4) and standards for volatile organic compounds (VOCs) and sulfur dioxide emissions. The standards apply across a variety of emission sources in the oil and natural gas source category (i.e., production, processing, transmission and storage) that are constructed, modified or reconstructed after September 18, 2015. Annual reporting is also required by this rule.

State

A variety of statewide rules and regulations have been implemented or are in development in California that mandate the quantification or reduction of GHGs. Several gubernatorial EOs establish statewide GHG reduction goals. As a result of Senate Bill (SB) 97, the California Environmental Quality Act (CEQA) requires an analysis and mitigation of emissions of GHGs and climate change in relation to a proposed project, where a project will result in a significant increase of GHG emissions. Certain Air Pollution Control Districts have proposed their own levels of significance. See the discussion of SJVAPCD significance thresholds in Section 4.8.4, *Impacts Mitigation Measures*.

Executive Order S-1-07

EO S-1-07 recognizes that the main source of GHG emissions in California is from the transportation sector and establishes a goal to reduce the carbon intensity of transportation fuels sold in California by at least 10 percent by 2020. As a result of EO S-1-07, CARB approved a proposed regulation to implement the Low Carbon Fuel Standard (LCFS) to reduce GHG emissions from the transportation sector in California by approximately 16 MMT CO_2e by 2020. The LCFS is designed to reduce California's dependence on petroleum, create a lasting market for clean transportation technology, and stimulate the production and use of alternative, low-carbon fuels in California. It provides a durable framework that establishes performance standards that fuel producers and importers must meet each year beginning in 2011.

The LCFS includes a protocol for select carbon management projects to become certified and generate LCFS credits. The Carbon Capture and Sequestration Protocol applies to carbon capture and sequestration projects that capture CO_2 and sequester it onshore, in either saline or depleted oil and gas reservoirs, or oil and gas reservoirs used for CO_2-enhanced oil recovery. The Carbon Capture and Sequestration Protocol applies to both new and existing carbon capture and sequestration projects, provided the projects meet the requirements for permanence pursuant to Section C of the protocol. Certified projects must successfully demonstrate adherence to rigorous pre-construction, operational, and site closure standards designed to strengthen environmental

performance. The Carbon Capture and Sequestration Protocol is designed to layer on top of existing federal carbon sequestration regulations designed to protect the environment (CARB 2018).

Executive Orders S-3-05 and B-30-15 – Statewide Emission Reduction Targets

EO S-3-05 was established by Governor Arnold Schwarzenegger in June 2005 and sets statewide emission reduction targets through the year 2050:

- by 2010, reduce GHG emissions to 2000 levels;
- by 2020, reduce GHG emissions to 1990 levels; and
- by 2050, reduce GHG emissions to 80 percent below 1990 levels.

EO B-30-15 sets a target date of 2030 to reduce GHG emissions to 40 percent below 1990 levels. EOs S-3-05 and B-30-15 are only applicable to "State agencies with jurisdiction over sources of greenhouse gas emissions" (Order 4-29-2015 Section 2), and Kern County is not a State agency. Furthermore, there is currently no implementation strategy for these EOs (i.e., a plan, which apportions GHG reductions by economic sector/activity/region, similar to CARB's Climate Change Scoping Plan).

Senate Bill 97

SB 97 was enacted requiring the Office of Planning and Research (OPR) to develop guidelines for the mitigation of GHG emissions, or the effects related to releases of GHG emissions. OPR submitted proposed amendments to the Natural Resources Agency in accordance with SB 97 regarding analysis and mitigation of GHG emissions. As directed by SB 97, the Natural Resources Agency adopted Amendments to the CEQA Guidelines for GHG emissions, which became effective in 2010.

Senate Bill 375

SB 375 establishes mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions. CARB adopted the vehicular GHG emissions reduction targets, in consultation with the metropolitan planning organizations (MPOs), which require a 7 to 8 percent reduction by 2020 and a 13 to 16 percent reduction by 2035, for each MPO. SB 375 recognizes the importance of achieving significant GHG reductions by working with cities and counties to change land use patterns and improve transportation alternatives. Through the SB 375 process, MPOs, such as the Kern Council of Governments (KCOG), will work with local jurisdictions in the development of sustainable community strategies (SCS) designed to integrate development patterns and the transportation network in a way that reduces GHG emissions while meeting housing needs and other regional planning objectives. KCOG's current reduction target for per capita vehicular emissions from passenger vehicles and light-duty trucks is 9 percent by 2020 and 15 percent by 2035 compared to 2005 (KCOG 2022).

KCOG most recently adopted the 2022 Regional Transportation Plan (RTP), which includes an SCS component in accordance with SB 375. The 2022 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. The SCS component strives to reduce polluting tailpipe emissions from passenger vehicle and light duty truck travel by better coordinating transportation expenditures with forecasted development patterns to help meet CARB GHG targets for the region.

Assembly Bill 32 and Senate Bill 32

In 2006, the California State Legislature adopted AB 32 (codified in the California Health and Safety Code [HSC], Division 25.5 – California Global Warming Solutions Act of 2006), 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.

While acknowledging that national and international actions will be necessary to fully address the issue of global warming, AB 32 lays out a program to inventory and reduce GHG emissions in California and from power generation facilities located outside the state that serve California residents and businesses. CARB adopted a list of discrete early action measures for implementation to reduce GHG emissions in accordance with its responsibility per AB 32. The 1990 baseline emissions inventory for California was also adopted for the 2020 statewide emissions cap.

Subsequent legislation has included SB 32, which expanded upon AB 32 to reduce GHG emissions to 40 percent below the 1990 levels by 2030; AB 197 which increased CARB's legislative oversight by adding two legislatively appointed non-voting members to the CARB Board and provided additional protection to disadvantaged communities; SB 350, which increased California's renewable energy electricity procurement goal and SB 100, which established a landmark policy requiring renewable energy and zero-carbon resources to supply 100 percent of electrical retail sales to end use customers and 100 percent of electricity procured to serve state agencies by 2045.

Assembly Bill 1279

The California Climate Crisis Act (AB 1279) establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative GHG emissions thereafter; and to ensure that by 2045 statewide anthropogenic GHG emissions are reduced at least 85 percent below 1990 levels. AB 1279 requires CARB to ensure that Scoping Plan updates identify and recommend measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO_2 removal solutions and carbon capture, utilization, and storage (CCUS) technologies.

Senate Bill 905

Senate Bill 905 (SB 905, Caballero. Carbon sequestration: Carbon Capture, Removal, Utilization, and Storage Program.) signed by Governor September 16, 2022, provides for the creation of a Carbon Capture Regulatory Framework. SB 905 requires CARB to establish a "Carbon Capture, Removal, Utilization and Storage Program" to evaluate CCUS and CO_2 removal (CDR) technologies. SB 905 requires CARB to:

- Establish a “Carbon Capture, Removal, Utilization and Storage Program to evaluate the efficacy, safety, and viability of CCUS.” CARB will also be required to enhance monitoring procedures for leakage.
- Ensure that CO_2 capture, removal, and sequestration projects include specified components including, among others, certain monitoring activities.
- By January 1, 2025, regulations for a unified permit application, for the construction and operation of CCUS projects (including an expedited review process), must be adopted. All CCUS projects within California will be required to use this application process and CARB will develop a centralized public database to track all in-state projects.
- By January 1, 2025, develop a centralized public database to track the deployment of CCUS and CDR technologies and the development of CO_2 capture, removal, and sequestration projects throughout the state.
- By January 1, 2025, adopt protocols to support additional and new methods for CO_2 utilization and CO_2 storage.
- By January 1, 2025, adopt financial responsibility regulations for CCUS projects that require the CO_2 storage operator to maintain financial responsibility for not less than 100 years after the last date of injection.
- In addition to permitting procedures, CARB must publish a framework for governing agreements regarding two or more tracts of land overlying the same geologic storage reservoir or reservoirs by July 1, 2025. The agreements will set out to manage, develop, and operate CCUS or CDR projects. SB 905 ensures that title to any geologic storage reservoir for CO_2 is vested in the owner of the overlying surface estate (unless it has been severed and separately conveyed).
- CCUS project operators must provide no less than 60 days before commencing development of CO_2 capture, removal and storage (sequestration) project, written notice to each owner of a surface or subsurface or subsurface estate adjacent to or within a geologic storage complex or reservoir. Project operators must also prove and maintain financial responsibility for the project. Agreements between operators and relevant parties, that any drilling or extraction be prohibited in the geologic storage reservoir for at least 100 years after the CO_2 is injected, must be made for every project. All project operators also need to create an air monitoring and mitigation plan that is submitted to CARB.

- Require changes in operations of a CO_2 capture, removal, or sequestration project to ensure public and environmental health and safety if the monitoring and reporting detects increased seismicity or CO_2 leakage outside the geologic storage reservoir.

Other requirements in SB 905 include monitoring and reporting requirements for CO_2 storage operators, the establishment of a working group on CO_2 storage, and the restriction of CO_2 injection into a Class II injection well for purposes of enhanced oil recovery.

Senate Bill 1314

Senate Bill 1314 (Limón. Oil and gas: Class II injection wells: enhanced oil recovery) signed by Governor September 16, 2022, prohibits operators from injecting a concentrated CO_2 fluid produced by a CO_2 capture project or a CO_2 capture and sequestration project into a Class II injection well for purposes of enhanced oil recovery, including the facilitation of enhanced oil recovery from another well.

Assembly Bill No. 1757

Assembly Bill 1757 (Cristina Garcia. California Global Warming Solutions Act of 2006: climate goal: natural and working lands. signed by the Governor September 16, 2022, requires the Natural Resources Agency (NRA), in collaboration with CARB and other specified state entities, to determine on or before January 1, 2024, an ambitious range of targets for natural carbon sequestration and for nature-based climate solutions that reduce greenhouse gas emissions for 2030, 2038, and 2045 to support state goals to achieve carbon neutrality and foster climate adaptation and resilience.

By January 1, 2025, CARB must develop standard methods for state agencies to consistently track GHG emissions and reductions; carbon sequestration; and, where feasible and in consultation with the NRA and the Department of Food and Agriculture, additional benefits from natural and working lands over time. In estimating and tracking GHG emissions and reductions and carbon sequestration from natural working lands, CARB must account for GHG emissions and reductions of CO_2, methane, and nitrous oxide related to natural and working lands and the potential impacts of climate change on the ability to reduce GHG emissions and sequester carbon from natural and working lands.

CARB 2022 Climate Change Scoping Plan

As required by AB 32, CARB developed an initial Climate Change Scoping Plan containing strategies to achieve the 2020 emissions cap in 2008. CARB released updates to the Climate Change Scoping Plan in 2014, 2017, and 2022.

The CARB 2022 Scoping Plan for Achieving Carbon Neutrality (CARB 2022 Scoping Plan) lays out a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045, as directed by AB 1279 (CARB 2022b). The CARB 2022 Scoping Plan acknowledges the need deploy all viable tools to address the existential threat that climate change presents, including carbon capture and sequestration. Modeling completed in

support of the CARB 2022 Scoping Plan clearly shows there is no path to carbon neutrality without carbon removal and sequestration, making it an essential tool to achieve carbon neutrality. Governor Newsom also recognized the importance of CO_2 removal strategies and directed CARB to establish CO_2 removal and carbon capture targets of 20 MMT CO_2 and 100 MMT CO_2 by 2030 and 2045, respectively, as well as signing 2022 legislation on carbon removal and sequestration, including: AB 1279, SB 905, SB 1137, and AB 1757 (CARB 2022b).

Mandatory Greenhouse Gas Reporting Regulation (17 CCR 95100-95158)

Statewide reporting of GHG emissions by major sources is required by AB 32. The Regulation for the Mandatory Reporting of Greenhouse Gas Emissions is applicable to industrial facilities, fuel suppliers, and electricity importers. The project would not be expected to trigger GHG reporting according to the rule.

Cap-and-Trade Program (17 CCR 95800 to 96022)

On October 20, 2011, CARB approved the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation (Cap-and-Trade Program) as part of the AB 32 implementation measures. The final regulation order was updated in 2018 and became effective as of April 1, 2019.

Cap-and-trade is a market-based regulation that is designed to reduce GHGs from multiple sources. Cap-and-trade sets a firm limit, or cap, on GHG emissions from all sources in the Cap-and-Trade Program which declines approximately 3 percent each year. In the market, a price on carbon is established for GHGs. Trading and market forces create incentives to reduce GHGs below allowable levels through investments in technological innovation in clean technologies. Carbon capture and storage (CCS) projects are not currently eligible to generate credits to sell or trade on the market, however, the stationary sources related to the installation of equipment would be t be expected to be subject to the program based on GHG emissions generated by that equipment.

Short-Lived Climate Pollutants – Senate Bill 605 and Senate Bill 1383

Short-lived climate pollutants (SLCP) (i.e., black carbon, fluorinated gases, and CH_4) are powerful climate forcers that remain in the atmosphere for a much shorter period of time than longer-lived climate pollutants. Their relative potency, when measured in terms of how they heat the atmosphere, can be tens, hundreds, or even thousands of times greater than that of CO_2. The impacts of SLCP are especially strong over the short term. Reducing these emissions can make an immediate beneficial impact on climate change.

SLCP emissions reductions will support achieving AB 32 and SB 32 GHG emission reduction targets. SB 605 directed CARB, in coordination with other State agencies and local air districts, to develop a comprehensive SLCP reduction strategy, and SB 1383 directed CARB to approve and begin implementing this strategy. This legislation also set statewide emissions reduction targets specifying a 40 percent reduction in CH_4, a 40 percent reduction in HFCs, and a 50 percent reduction in anthropogenic black carbon below 2013 levels by 2030. The bill also established

specific targets for reducing organic waste in landfills and provided specific direction for CH_4 emissions reductions from dairy and livestock operations.

The SLCP Reduction Strategy, approved by the Board in March 2017, lays out a range of options to reduce SLCP emissions in California, including regulations, incentives, and other market-supporting activities. The SLCP Strategy also informed the CARB 2022 Scoping Plan.

Other Mobile Source Reduction Requirements

Several other State provisions address the GHG emissions reduction targets set by CARB for mobile sources, including trucks, passenger vehicles, trains, and ships. These measures include:

- Low Carbon Fuel Standard (EO S-01-07)
- Advanced Clean Cars Program
- SmartWay Truck Efficiency Regulation
- AB 32 Cap-and-Trade Program as applicable to transportation fuel suppliers (beginning January 1, 2015)
- SB 375 (Land Use Planning) including the development of a Sustainable Communities Strategy as part of a Metropolitan Planning Organization's Regional Transportation Plan.

In particular, SB 375 requires the Air Resources Board to set regional targets for GHG emission reductions from passenger vehicles and light duty trucks and requires each regional MPO to adopt an (SCS) into its regional transportation plan that would allow the region to meet its GHG emission reduction target. The KCOG adopted the SCS for Kern County as part of its RTP in 2014. The RTP and SCS incorporate forecasted development patterns, modeling and measures designed to integrate land use and transportation planning to reduce local and regional GHG emissions. Oil and gas resources, as well as other land uses, are components of the SCS. While SB 375 does not require local governments to amend their general plans to implement the SCS, it provides incentives for them to do so. Implementation of SB 375 is expected to substantially reduce GHG emissions in the County and throughout the state.

Local

San Joaquin Valley Air Pollution Control District

The project area is located within Kern County's portion of the SJVAB. Kern County is included among the eight counties that comprise the SJVAPCD. The SJVAPCD acts as the regulatory agency for air pollution control in the SJVAB and is the local agency empowered to regulate emissions for the project area. The SJVAPCD is a CEQA Trustee Agency for the project.

In August 2008, the SJVAPCD adopted its Climate Change Action Plan (CCAP). The CCAP directed the SJVAPCD to develop guidance to assist CEQA lead agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project GHG emissions on global climate change (SJVAPCD 2008).

On December 17, 2009, the SJVAPCD adopted Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA (SJVAPCD 2009), which outlined the SJVAPCD's methodology for assessing a project's significance for GHGs under CEQA. The following criteria was outlined in the document to determine whether a project could have a significant impact:

- Projects determined to be exempt from the requirements of CEQA would be determined to have a less than significant individual and cumulative impact for GHG emissions and would not require further environmental review, including analysis of project specific GHG emissions. Projects exempt under CEQA would be evaluated consistent with established rules and regulations governing project approval and would not be required to implement Best Performance Standards (BPS).
- Projects complying with an approved GHG emission reduction plan or GHG mitigation program which avoids or substantially reduces GHG emissions within the geographic area in which the project is located would be determined to have a less than significant individual and cumulative impact for GHG emissions. Such plans or programs must be specified in law or approved by the lead agency with jurisdiction over the affected resource and supported by a CEQA compliant environmental review document adopted by the lead agency. Projects complying with an approved GHG emission reduction plan or GHG mitigation program would not be required to implement BPS.
- Projects implementing BPS would not require quantification of project specific GHG emissions. Consistent with CEQA Guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.
- Projects not implementing BPS would require quantification of project specific GHG emissions and demonstration that project specific GHG emissions would be reduced or mitigated by at least 29 percent, compared to business as usual (BAU), including GHG emission reductions achieved since the 2002–2004 baseline period. Projects achieving at least a 29 percent GHG emission reduction compared to BAU would be determined to have a less than significant individual and cumulative impact for GHG.
- Notwithstanding any of the above provisions, projects requiring preparation of an EIR for any other reason would require quantification of project specific GHG emissions. Projects implementing BPS or achieving at least a 29 percent GHG emission reduction compared to BAU would be determined to have a less than significant individual and cumulative impact for GHG.

The SJVAPCD determined BAU and baseline emissions have been established based on the years 2002–2004 and 2020, respectively. The 2020 projected baseline has passed, and at this time, no new guidance has been approved for determining BAU and projected baseline for the next target year. Therefore, the 29 percent reduction from BAU cannot be applied to the project in order to determine significance. Additionally, a BPS threshold has not been established.

Kern County General Plan

The project area is located within the Kern County General Plan (KCGP) area and, therefore, would be subject to applicable policies and measures of the KCGP. The Land Use, Conservation, and Open Space Element of the KCGP includes goals, policies, and implementation measures applicable to the project that would indirectly impact GHG emissions through the reduction of fossil fuel use, as described below.

Chapter 1. Land Use, Conservation, and Open Space Element

1.10. General Provisions

1.10.2. Air Quality

Policies

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.

Policy 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.

Implementation Measures

Implementation Measure F. All discretionary permits shall be referred to the appropriate air district for review and comment.

Implementation Measure G. Discretionary development projects involving the use of tractor trailer rigs shall incorporate diesel exhaust reduction strategies including, but not limited to:

a. Minimizing idling time.

b. Electrical overnight plug-ins.

Implementation Measure H. Discretionary projects may use one or more of the following to reduce air quality effects:

a. Pave dirt roads within the development.
b. Pave outside storage areas.
c. Provide additional low Volatile Organic Compounds (VOC) producing trees on landscape plans.
d. Use of alternative fuel fleet vehicles or hybrid vehicles.
e. Use of emission control devices on diesel equipment.
f. Develop residential neighborhoods without fireplaces or with the use of Environmental Protection Agency certified, low emission natural gas fireplaces.
g. Provide bicycle lockers and shower facilities on site.
h. Increasing the amount of landscaping beyond what is required in the Zoning Ordinance (Chapter 19.86).
i. The use and development of park and ride facilities in outlying areas.
j. Other strategies that may be recommended by the local Air Pollution Control Districts.

4.8.4 Impacts and Mitigation Measures

This section describes the methodology used in conducting the CEQA impact analysis for GHG emissions; the thresholds of significance used in assessing impacts to GHG emissions; and the assessment of impacts to GHG emissions and global climate change, including relevant mitigation measures.

Methodology

The analysis presented within this section is based on both qualitative and quantitative approaches for determining GHG impacts associated with construction and operation of the project. The findings in the Air Quality Impact Analysis prepared for the project (located in Appendix B-1 of this EIR), were used to assess the project's impacts related to GHG emissions.

GHG emissions associated with construction of the project were estimated using the California Emissions Estimator Model (CalEEMod). The CalEEMod equipment list was updated to reflect the list of proposed construction equipment and scheduling information that was provided by the project proponent. Construction durations of 18 days per well, two years for the capture facilities and one year for the pipelines were used. Construction traffic volumes entered into CalEEMod matched the traffic report prepared for the project (Appendix I) Applying model defaults as well as a conservative analysis approach, construction emissions were estimated as if construction started in January of 2024. The dates entered into the CalEEMod program may not represent the actual dates the equipment will operate; however, the total construction time is accurate, and therefore, all estimated emission totals are conservative and reflect a reasonable and legally sufficient estimate of potential impacts. All construction equipment activity assumption levels were based on the

specified CalEEMod default values for type and number of equipment and horsepower, hours per day and days per week. CalEEMod inputs and resulting outputs can be found in the Air Quality Impact Analysis in Appendix B-1.

SJVAPCD's required construction site measures for all projects were also applied:

- Water exposed areas three times per day
- Reduce vehicle speed to less than 15 miles per hour

Operational sources of GHG associated with the project include vehicle exhaust from new worker trips to and from the project site. Exhaust emissions would vary substantially from day to day but would average out over the course of an operational year. The traffic study prepared for the project analyzed the potential for vehicular traffic from the operations and maintenance of the compression and pumping facility (see Appendix I) (Ruettgers & Schuler 2023). The traffic study estimated an average of 20 new daily trips from worker vehicles. Mobile emissions were estimated using EMFAC2021 v.1.0.2 for an operational year of 2025 (see Air Quality Impact Analysis in Appendix B-1).

The CO_2 capture facility would be located in proximity to the stationary source, the cryogenic and fractionation natural gas plant (CGP-1), and would capture CO_2 from natural gas streams, which provides fuel for the 550-megawatt Elk Hills Power Plant. In order to assess impacts of the project, baseline emissions from the existing CO_2 source facilities were calculated. Baseline emissions were taken from the facilities' 2022 annual emissions inventory and are based on actual historical data (see Air Quality Impact Analysis in Appendix B-1). (The project is not requesting any increase to any existing permitted stationary sources.)

Additionally, the project, as proposed, has the capacity for up to 48 MMT of estimated storage and is capable of storing in excess of 1.5 MMT of CO_2 per year within Reservoir 26R pursuant to its Class VI Underground Injection Control (UIC) application (included as Appendix E-2).

The installed amine equipment will have a capture nameplate efficiency of 95 percent. The source of CO_2 for injection as part of this project would be Elk Hills oilfield gas; no additional sources of captured CO_2 or new source development are proposed with this EIR. The project, however, will be approved for the total permanent storage of CO_2 by this Conditional Use Permit (CUP) with a permit from the EPA UIC for operation for the following amounts:

26 R - up to 1,460,000 tons per year injection	26 years = 37.96 MMT stored
A1–A2 up to 750,000 tons per year injected	15 years = 11.25 MMT stored
1 – 2.21 million tons per year injected	49.25 MMT stored.

All future sources are required to be permitted with a separate CUP process and environmental review for compliance with CEQA.

GHG emissions from implementation of the project were calculated for both construction and new operational mobile sources (vehicular worker trips) and GHG reductions from implementation of the project were also quantified and considered when determining impacts.

As stated previously, climate change is a cumulative and global issue causing global impacts. Thus, the study area for climate change and the impact analysis of GHG emissions is broad because climate change is influenced by global emissions and their associated effects. Those effects of climate change can also have localized impacts on resources and ecosystems in California. Despite that fact that climate change is a global issue, CEQA only requires that an EIR address indirect impacts that are not speculative.

Section 4.8.3, *Regulatory Setting*, shows the applicable laws and regulations that ensure management and ongoing reductions of GHG at a state, regional, and local levels. All project activities must comply with applicable federal, state, and local laws and regulations and will be subject to review by the SJVAPCD.

Note that analytical tools have not been developed that can determine the effect on worldwide global warming from a particular project-specific increase in GHG emissions, or the effect of global GHG emissions on the climate at a particular location.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist, following the "Environmental Checklist Form," Appendix G to the Statewide CEQA Guidelines as amended by the California Natural Resources Agency and effective on December 28, 2018, state that a project would have significant impacts on GHG emissions if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Pursuant to the CEQA Appendix G thresholds, impacts were evaluated based on whether the project would be consistent with the State's applicable GHG reduction goals, plans, policies, and regulatory requirements. Specifically, those plans and policies established in CARB's 2022 Climate Change Scoping Plan as well as other federal, state, and local policies.

Where an approved GHG emission reduction program is not in place, guidance documents next rely on the use of performance-based standards, otherwise known as Best Performance Standards (BPS), as a basis for assessing the significance of project GHG emissions on global climate change under CEQA. BPS consist of established specifications or project design elements that are used as a method of determining significance of project specific GHG emission impacts. BPS are defined as the most effective achieved in practice means of reducing or limiting GHG emissions from a GHG emissions source. BPS for stationary source projects include equipment type, equipment

design, and operational and maintenance practices for the identified service, operation, or emissions unit class or category (SJVAPCD 2009a).

Table 4.8-2 describes the SJVAPCD BPS applicable to the project.

Table 4.8-2: SJVAPCD Best Performance Standards Applicable to the Project

Class	Category	Best Performance Standard	Percentage Achieved GHG Emission Reduction Relative to Baseline Emissions	
Components at Light Crude Oil and Natural Gas Production, Natural Gas Processing Facilities, Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants (Approved 07/01/2010)	Components Subject to Rules 4409 and 4555 Requirements	Minimize GHG emissions by applying leak standards and I&M requirements to components subject to Rules 4409 and 4455 requirements	Light Crude Oil and Natural Gas Production	60%
			Natural Gas Processing	82%
			Refineries	86%
			Gas Liquid Processing	89%
	Components Not Subject to Rules 4409 and 4555 Requirements	Minimize fugitive GHG emissions by applying leak standards and I&M requirements to components not subject to Rules 4409 and 4455 requirements	Components not subject to Rules 4409 and 4455 Requirements	91%
Thermally Enhanced Oil Recovery (Approved 07/01/2010)	Components Subject to Rule 4401	Minimize fugitive GHG emissions by applying leak standards and I&M to components subject to Rule 4401	28%	
	Components Not Subject to Rule 4401	Minimize fugitive GHG emissions by applying leak standards and I&M to components not subject to Rule 4401	48%	
Steam Generators (Approved 06/24/2010)	Oilfield	Very high efficiency generator design with: 1. A convection section with at least 235 square feet of heat transfer surface area per MMBtu/h of maximum rated heat input (verified by manufacturer) or a manufacturer's overall thermal efficiency rating of 88%. and 2. Variable frequency drive high efficiency electrical motors driving the blower and water pump.	13%	

Sources: SJVAPCD 2010a, 2010b, 2010c, 2011
Key:
GHG = greenhouse gases
I&M = inspection and maintenance
MMBtu/h = million British thermal units per hour

The District recommends use of BPS for assessing climate change impacts to streamline the process of determining significance under CEQA. BPS are not intended as a required emission reduction measure. Under SJVAPCD guidance, projects implementing BPS would be determined to have a less than cumulatively significant impact on global climate change. Projects that do not comply with an approved GHG emission reduction plan or use BPS must demonstrate a 29 percent reduction in GHG emissions from BAU in order to be determined to have a less than cumulatively significant impact on global climate change. BAU is determined by multiplying 2002–2004 emission factors by the activity expected to occur in 2020.) The guidance does not limit a lead agency's authority to establish its own process and guidance for determining significance of project-related impacts on global climate change (SJVAPCD 2009).

Project Impacts

As discussed previously, climate change impacts are inherently global and cumulative, and not project specific. The SJVAPCD's March 2015 Guidance for Assessing and Mitigating Air Quality Impacts observes that:

"It is widely recognized that no single project could generate sufficient GHG emissions to noticeably change global climate temperature. However, the combination of GHG emissions from past, present and future projects could contribute substantially to global climate change. Thus, project specific GHG emissions should be evaluated in terms of whether or not they would result in a cumulatively significant impact on global climate change" (SJVAPCD 2015, section 8.9.).

Impact 4.8-1: Generate Greenhouse Gas Emissions, Either Directly or Indirectly, that may have a Significant Impact on the Environment

The project would generate GHG emissions during construction and operational activities. Three GHGs associated with the project, CO_2, CH_4, and N_2O, would be emitted from on-road vehicles and non-road equipment during construction. The estimated GHG emissions from construction activities associated with the project are shown in Table 4.8-3.

Table 4.8-3: Estimated Construction Greenhouse Gas Emissions

Emission Source	GHG Emissions (MT CO_2e)
Construction of Facilities	2,309
Construction of Pipelines	1,109
Construction of Well Pads	159
Construction of Wells	879
Total Construction Emissions	**4,456**

Source: Trinity Consultants 2023
Notes:
Refer to Appendix B-1 for all assumptions and calculations.
Totals may be slightly off due to rounding.
Key:
GHG = greenhouse gases
MT CO_2e = metric tons of carbon dioxide equivalent

CO_2, CH_4, and N_2O would also be emitted from new vehicle trips needed for project routine operational and maintenance activities. GHG reductions from implementation of the project, which consists of capture and injection of Elk Hills gas, were also quantified and considered when determining impacts. The estimated GHG emissions from operational activities associated with the project are shown in Table 4.8-4.

Table 4.8-4: Estimated Operational Greenhouse Gas Emissions

Year	Total Emissions from Existing Plants (MT CO_2e) [(a)]	Capture Facility Mobile Emissions (MT CO_2e)	Captured and Injected Emissions (MT CO_2e) Total	Net Emissions (MT CO_2e)
Baseline	6,476,940	-	-	6,476,940
Capture Year 1 (2026)	6,476,940	85	101,743	6,375,282
Capture Year 2 (2027)	6,476,940	85	301,743	6,175,282
Capture Year 3 (2028)	6,476,940	85	301,743	6,175,282
Capture Year 4 (2029)	6,476,940	85	401,743	6,075,282
Capture Year 5 (2030)	6,476,940	85	701,743	5,775,282
Capture Year 6 (2031)	6,476,940	85	1,001,743	5,475,282
Capture Year 7 (2032)	6,476,940	85	1,451,743	5,025,282
Capture Year 8 (2033)	6,476,940	85	1,651,743	4,825,282
Capture Year 9 (2034)	6,476,940	85	1,851,743	4,625,282
Capture Year 10 (2035)	6,476,940	85	1,951,743	4,525,282
Capture Year 11 (2036)	6,476,940	85	2,150,000	4,327,025
Capture Year 12 (2037)	6,476,940	85	2,150,000	4,327,025
Capture Year 13 (2038)	6,476,940	85	2,150,000	4,327,025
Capture Year 14 (2039)	6,476,940	85	2,150,000	4,327,025
Capture Year 15 (2040)	6,476,940	85	2,150,000	4,327,025
Capture Year 16 (2041)	6,476,940	85	2,150,000	4,327,025
Capture Year 17 (2042)	6,476,940	85	2,150,000	4,327,025
Capture Year 18 (2043)	6,476,940	85	2,150,000	4,327,025

Table 4.8-4: Estimated Operational Greenhouse Gas Emissions

Year	Total Emissions from Existing Plants (MT CO_2e) [(a)]	Capture Facility Mobile Emissions (MT CO_2e)	Captured and Injected Emissions (MT CO_2e) Total	Net Emissions (MT CO_2e)
Capture Year 19 (2044)	6,476,940	85	2,150,000	4,327,025
Capture Year 20 (2045)	6,476,940	85	2,150,000	4,327,025
Total Years 1-20 (2026-2045)	**129,538,800**	**1,700**	**31,217,430**	**98,323,070**

Source: Trinity Consultants 2023
Refer to Appendix B-1 for all assumptions and calculations.
Notes: Totals may be slightly off due to rounding.
[(a)] Operational emissions from the existing CGP-1 Facility (S-9168) and Elk Hills Power Plant (S-3523) are presented in order to give a clear picture of what the project site will look like before and after project implementation. These facilities are not part of the project.
Key:
GHG = greenhouse gases
MT CO_2e = metric tons of carbon dioxide equivalent

As shown in Table 4.8-3, the project's total construction GHG emissions would be 4,456 MT CO_2e. Table 4.8-4 shows the project's operational GHG emissions of 85 MT CO_2e per year, or 1,700 MT CO_2e over the 20-year operational lifetime of the project. That amount will increase by each year beyond the 20 years, that injection activities occur. The life of the project is dependent on the sources permitted for injection into the storage, the ability of the project year by year to obtain CO_2 and inject at the maximum 2,210,000 million tons per year. and the maximum amount of storage permitted up to 49.21 MMT of CO_2 stored. The maximum storage quantities are regulated by this EPA Class IV UIC injection well permit and is determined by the EPA based on the quality of the pore space, and the size of the area of review. The determinations are for the permit are to protect drinking water and in conjunction with an approved CUP are binding on the project. Table 4.8-4 shows only the initial source permitted with this EIR (collection of pre-combustion oilfield gas from in-field CRC facilities) at the same rate. This is a projection, as the State of California policies that will ban fossil fuel production by 2045 may occur sooner and the gas plant may be forced to close sooner due to such policies. Total GHG reductions of 31,217,430 MT CO_2e over 20 years from implementation of the project, resulting in a net reduction in emissions from the existing sources associated with Elk Hills oilfield gas operations baseline of 129,538,800 MT CO_2e. Furthermore, the project would support California's EO B-55-18 mandate to achieve carbon neutrality by 2045 and net negative emissions thereafter and would not conflict with the state goals to reduce GHG emissions.

The proposed CCS component of the project, if approved, would permit a maximum of 2,210,000 tons per year injected and total underground pore space storage of 49 million tons with both reservoirs. The amount that can be injected into each of the two reservoirs, as shown in Table 4.8-5, is set by the EPA UIC Class VI injection permits and conditioned for the limits.by the Conditional Use Permit and this CEQA analysis. While there is a range in the EPA permits, the higher limit is shown.

Table 4.8-5: Proposed Permitted Injection Rate and Storage Capacity Limits

Reservoir	Injection Rate (MT/year)	Total Storage Capacity (MT)
26 R	1,460,000	37.96
A1-A2	750,000	11.25
Total	2,100,000	49.21

Source: California Resources Corporation 2023
Key:
MT = metric tons

The permitting process analyzed in this EIR is the total storage capacity site of 49.21 MMT within the 9,104 acres of the CUP boundary with a maximum injection of a total of 2.1 MMT per year, distributed between the reservoirs. Additional sources will need to be identified and permitted by the applicant and those sources must be legally permitted and disclosed as required by Mitigation Measure (MM) 4.9-11 (Section 4.9, *Hazards and Hazardous Materials*). Each of those sources will have capture facilities with the same amine technology or better and a reasonable assumption can be made that it would produce the same GHG emissions per ton of capture as evaluated for this initial source. Table 4.8-6 shows the estimated schedule of injection provided by the applicant, who is responsible for obtaining sources of CO_2 for injection into the project. All known sources are shown in Section 3.9 of Chapter 3, *Project Description*, but as they have not been permitted or completed CEQA, information cannot be provided on the total amount of GHG emissions they produce, how much will be captured, how much stored, how much additional created or how much will still be released to the atmosphere. Table 4.8-6 projects future operations through 2045, which is the life span capacity of A1A2 and the goal date of California's EO B-55-18 mandate to achieve carbon neutrality by 2045. It includes the injection of captured CO_2 from unknown sources and the estimated GHG emissions based on that amount from the actual capture process from those sources.

Table 4.8-6: Projected Injection 2026–2045

Year	Phase 1 GHG Injected (MT CO_2e)	Phase 2 GHG Injected (MT CO_2e)	Total GHG Injected (MT CO_2e)	GHG from Capture Facility (MT CO_2e)
Capture Year 1 (2026)	101,743	0	101,743	85
Capture Year 2 (2027)	301,743	0	403,486	253
Capture Year 3 (2028)	301,743	0	705229	253
Capture Year 4 (2029)	401,743	0	1,106,972	338
Capture Year 5 (2030)	501,743	200,000	1,808,715	589
Capture Year 6 (2031)	601,743	400,000	2,810,458	842
Capture Year 7 (2032)	701,743	750,000	4,262,201	1,219
Capture Year 8 (2033)	901,743	750,000	5,913,944	1,387
Capture Year 9 (2034)	1,101,743	750,000	7,765,687	1,556
Capture Year 10 (2035)	1,201,743	750,000	9,717,430	1,640
Capture Year 11 (2036)	1,400,00	750,000	11,867,430	1,806
Capture Year 12 (2037)	1,400,00	750,000	14,017,430	1,806
Capture Year 13 (2038)	1,400,000	750,000	16,167,430	1,806
Capture Year 14 (2039)	1,400,000	750,000	18,317,430	1,806
Capture Year 15 (2040)	1,400,000	750,000	20,467,430	1,806

Table 4.8-6: Projected Injection 2026–2045

Year	Phase 1 GHG Injected (MT CO_2e)	Phase 2 GHG Injected (MT CO_2e)	Total GHG Injected (MT CO_2e)	GHG from Capture Facility (MT CO_2e)
Capture Year 16 (2041)	1,400,000	750,000	22,617,430	1,806
Capture Year 17 (2042)	1,400,000	750,000	24,767,430	1,806
Capture Year 18 (2043)	1,400,000	750,000	26,917,430	1,806
Capture Year 19 (2044)	1,400,000	750,000	29,217,430	1,806
Capture Year 20 (2045)	1,400,000	750,000	31,217,430	1,806
Total Years 1-20 (2026-2045)	**20,117,430**	**11,100,000**	**31, 217, 430**	**26, 222**

Source: California Resources Corporation 2023
Key:
GHG = greenhouse gases
MT CO_2e = metric tons of carbon dioxide equivalent

While 31,217,430 MT of CO_2 will be captured from either an operating facility, such as a hydrogen plant for transportation fuels, or from a direct air capture technology that captures atmospheric CO_2, the capture technology itself creates CO_2 during operation. Table 4.8-6 estimates, based on use of existing amine technology, 26,222 MT of additional CO_2 will be created. MM 4.8-6 requires that both the CO_2 created by the initial project capture process as well as any outside sources that will send CO_2 for injection must mitigate the CO_2 produced to a level of "no net increase". While the projections are based on amine technology, newer forms of capture may not produce that level of CO_2 emissions and therefore, the projections are a conservative estimate based on the volume of injection.

The capture of the GHG from the initial source and other sources will reduce the amount of CO_2 in the atmosphere emitted by industries that are essential but hard to decarbonize, such as concrete and hydrogen transportation fuels. In the larger global accounting of GHG the amount is not enough to address overall regional climate change but does support California's EO B-55-18 mandate to achieve carbon neutrality by 2045. Accounting for the GHG emissions reductions from CCS, the project's impacts related to GHG emissions would be less than significant. However, the estimated reductions are contingent upon injected CO_2 remaining in the identified geographically confined reservoirs for storage in perpetuity without leakage from injection and capture activities. Should any of the injected CO_2 leak at injection or additional, unmitigated GHG emissions be created from the capture facility operations, then GHG emissions from the project would be potentially significant. Implementation of MM 4.8-1 through MM 4.8-6 would greatly reduce the likelihood of CO_2 escaping from the reservoirs, but the possibility of a release due to unforeseen circumstances or equipment failure remains. Given the background concentrations on a state-wide level, the contribution to greenhouse emission due to unknown release of emissions or stops to injection for monitoring failures remains significant and unavoidable.

Mitigation Measures

MM 4.8-1 Prior to any injection of CO_2 the owner/operator shall submit a monitoring plan that complies with all requirements of the EPA UIC permit issued for the project to demonstrate the retention of CO_2 in the injection/hydrocarbon reservoir zone The plan shall be submitted to the Kern County Planning and Natural Resources Department concurrent with submittal to the EPA for review. A copy of the final approved plan from the EPA shall be provided to the Kern County Planning and Natural Resources Department.

MM 4.8-2 The owner/operator shall submit to the Kern County Planning and Natural Resources Department a quarterly report on the amount of CO_2 injected into the CCS project, and the source of the CO_2. The reports shall be filed no later than the following dates of each year:

- First quarter – March 31
- Second Quarter – June 30
- Third Quarter – September 30
- Fourth Quarter – December 18 (early deadline)

MM 4.8-3 All new permitted stationary sources associated with the CCS project shall comply with the Cap-and Trade regulation (e.g., by reducing greenhouse gas emissions within their facilities or by surrendering greenhouse gas allowances, offset credits, or other compliance instruments to offset the greenhouse gas increases), and implement Best Performance Standards applicable to greenhouse gas reduction for Components at Light Crude Oil and Natural Gas Production, Natural Gas Processing Facilities.

MM 4.8-4 The CCS project shall implement methods to recover for reuse or destroy methane existing in associated gas and casinghead gas, as follows: a. Recover all associated gas produced from the reservoir via new wells, regardless of the well type, except for gas produced from wildcat and delineation wells or as a result of start-up, shutdown and maintenance activities (whether planned or unplanned), system failures, and emergencies in accordance with San Joaquin Valley Air Pollution Control District regulations (Rule 4401 and 4409), as this may be amended over time.

MM 4.8-5 The CCS project shall implement any regulations adopted or amended for methane.

MM 4.8-6 The project shall offset all greenhouse gas emissions associated with the capture facility, and construction equipment not covered by the Cap and-Trade program or other mandatory greenhouse gas emission reduction measures through owner/ operator reductions of greenhouse gas emissions as verified by the San Joaquin

Valley Air Pollution Control District, through acquisition of offset credits from the California Air Pollution Control Officers Association Exchange Register or other third party greenhouse gas reductions as verified by the San Joaquin Valley Air Pollution Control District, or through inclusion in an Emission Reduction Agreement, to offset Project-related greenhouse gas emissions that are not included in the Cap-and-Trade program to assure that no net increase in greenhouse gas emissions from the Project construction or operation occur. All sources providing CO_2 for injection must certify that any additional CO_2 generated from the source capture facility has been mitigated to "no net increase" before injection at Carbon Terra Vault 1 (Kern County).

Level of Significance After Mitigation

Impacts would be significant and unavoidable.

Impact 4.8-2: Conflict with any Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gas

The project regulatory setting (Section 4.8.3, *Regulatory Setting*) describes the applicable plans, policies, and regulations adopted at federal, state, and local levels for the purpose of reducing GHG emissions in Kern County. As discussed above, impacts were evaluated based on whether the project would be consistent with the State's applicable GHG reduction goals, plans, policies, and regulatory requirements as well as other federal, state, and local policies, as provided in the following analyses.

CARB 2022 Scoping Plan

The CARB 2022 Scoping Plan lays out a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045. It acknowledges the need deploy all viable tools to address the existential threat that climate change presents, including carbon capture and sequestration (i.e., storage). Modeling completed in support of the CARB 2022 Scoping Plan clearly shows there is no path to carbon neutrality without carbon removal and sequestration, making it an essential tool to achieve carbon neutrality. Governor Newsom also recognized the importance of CO_2 removal strategies and directed CARB to establish CO_2 removal and carbon capture targets of 20 MMT CO_2 and 100 MMT CO_2 by 2030 and 2045, respectively, as well as signing 2022 legislation on carbon removal and sequestration, including: AB 1279, SB 905, SB 1137, and AB 1757 (CARB 2022b).

CCS is identified as one of the strategies for carbon removal and sequestration in the CARB 2022 Scoping Plan. Although no CCS projects are currently operational in California, CCS is not a new concept or technology. As described in the CARB 2022 Scoping Plan, twenty years of CCS testing show that CCS is a safe and reliable tool, and a number of CCS projects have been implemented elsewhere in the United States and worldwide since the 1970s.

The CARB 2022 Scoping Plan defines carbon management as the capture, movement, and sequestration of CO_2 through mechanical solutions for both capture at point sources and direct

removal from the atmosphere through direct air capture. CARB states that enabling policies and regulations across each of these steps is necessary for individual projects, and on a broader scale, for delivering reductions in support of the state's carbon neutrality and long-term carbon negative goals. The following strategies for Success are identified in the CARB 2022 Scoping Plan for the Carbon Dioxide Removal and Capture Sector:

- Implement SB 905.
- Convene a multi-agency Carbon Capture and Sequestration Group composed of federal, state, and local agencies to engage with environmental justice advocates, tribes, academics, researchers, and community representatives to identify the current status, concerns, and outstanding questions concerning carbon capture and sequestration, and develop a process to engage with communities to understand specific concerns and consider guardrails to ensure safe and effective deployment of carbon capture and sequestration.
- Iteratively update the CARB Carbon Capture and Sequestration Protocol with the best available science and implementation experience.
- Incorporate carbon capture and sequestration into other sectors and programs beyond transportation where cost-effective and technologically feasible options are not currently available and to achieve the 85 percent reduction in anthropogenic sources below 1990 levels as called for in AB 1279.
- Evaluate and propose, as appropriate, financing mechanisms and incentives to address market barriers for carbon capture and sequestration and CDR.
- Evaluate and propose, as appropriate, the role for carbon capture and sequestration in cement decarbonization (SB 596) and as part of hydrogen production pathways (SB 1075).
- Support carbon management infrastructure projects through core California Energy Commission research, development, and demonstration programs.
- Continue to explore carbon capture applications for producing or leveraging zero carbon power for reliability needs as part of SB 100.
- Consider carbon capture infrastructure when developing hydrogen roadmaps and strategy, especially for non-electrolysis hydrogen production.
- Evaluate and streamline permitting barriers to project implementation while protecting public health and the environment.
- Explore options for how local air quality benefits can be achieved when carbon capture and sequestration is deployed.
- Explore opportunities for carbon capture and sequestration and CDR developers to leverage existing infrastructure, including subsurface infrastructure.
- Explore permitting options to allow for scaling the number of sources at carbon sequestration hubs.

As a CCS project, the project is essential to meeting California's targets for carbon neutrality, GHG emissions reduction, and CO_2 removal and carbon capture. The project would support the Strategies for Success identified in the CARB 2022 Scoping Plan, which focus on expanding CO_2 removal and carbon capture, and would comply with any new regulations developed as a result of implementation of the identified Strategies. Furthermore, as discussed previously, the project is reasonably expected to reduce region wide and Statewide GHG emissions over the expected life of the project. Therefore, the project would be consistent with the CARB 2022 Scoping Plan.

KCOG's 2022 RTP

KCOG's 2022 RTP incorporates local land use projections and circulation networks in city and county general plans. The SCS component strives to reduce polluting tailpipe emissions from passenger vehicle and light duty truck travel by better coordinating transportation expenditures with forecasted development patterns to help meet CARB GHG targets for the region. The 2022 RTP is not directly applicable to the project because the purpose is to provide direction and guidance by making the best transportation and land use choices for future development. Nevertheless, the project would not conflict with the goals and policies of the 2022 RTP. In addition, the project would not impact local transportation or land use during operation.

Other Federal/State/Local Policies

Vehicle and Fuel Standards: CARB has set a number of vehicle and fuel emissions standards to reduce GHG emissions. Vehicles that access the project site would comply with CARB vehicle and fuel standards in effect at the time.

Kern County General Plan: Air Quality Mitigation Measures would ensure that the project is consistent with the Kern County General Plan Air Quality Element Policies, Goals, and Implementation Measures that will indirectly reduce GHG emissions by reducing fossil fuel combustion.

Overall, the project would support California's EO B-55-18 mandate to achieve carbon neutrality by 2045 and net negative emissions thereafter, align with the CARB 2022 Scoping Plan strategies for increasing CO_2 removal and carbon capture, and comply applicable federal, State, and local policies. Furthermore, the project is reasonably expected to reduce region wide and Statewide GHG emissions over the expected life of the project and therefore would not conflict with state goals to reduce GHG emissions.

Accounting for permanent CCS and the resulting GHG emissions reductions, the project's impacts related to consistency with applicable GHG reduction plans, policies, and regulations would be less than significant. However, this is contingent upon injected CO_2 remaining in the identified geographically confined reservoirs for storage in perpetuity. Should the injected CO_2 fail to remain in the reservoirs in perpetuity, GHG emissions from the project would be potentially significant and the project would have the potential to conflict with GHG reduction plans. Implementation of MM 4.8-1 and MM 4.8-2 would greatly reduce the likelihood of CO_2 escaping from the reservoirs, but the possibility of a release due to unforeseen circumstances or equipment failure remains. Therefore, Impact 4.8-2 would remain significant and unavoidable.

Mitigation Measures

Implement MM 4.8-1 and MM 4.8-2, as described above.

Level of Significance After Mitigation

Impacts would be significant and unavoidable.

4.8.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015; supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 of other wells (cyclic wells, SB 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to GHG emissions and global climate change is considered the SJVAB. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.o, *Cumulative Projects*, would have on GHG emissions and global climate change. As stated previously, climate change is a cumulative and global issue causing global impacts. Thus, a broad geographic scope of analysis is appropriate because climate change is influenced by global emissions and their associated effects.

Impact 4.8-3: Cumulative Greenhouse Gas Emissions Impacts

With regard to impacts to GHG emissions and global climate change, the project has the potential to contribute significantly to cumulative impacts within the region and globally. A complete analysis of the cumulative impacts of oil and gas development in Kern County is provided in Chapter 4.7 *Greenhouse Gas Emissions and Global Climate Change* of the Kern County Oil and Gas EIR.

Emissions of GHGs and their contribution to global climate change are considered a cumulative impact by definition. As shown in Table 4.8-2, the project's total construction GHG emissions would be 4,456 MT CO_2e. Table 4.8-3 shows the project's operational GHG emissions of 85 MT CO_2e per year, or 1,700 MT CO_2e over the 20-year operational lifetime of the project. Additionally, Table 4.8-3 shows total GHG reductions of 3,967,977 MT CO_2e over 20 years from implementation of the project, resulting in a net reduction in emissions from the existing sources associated with Elk Hills oilfield gas operations baseline. Since the project individually results in a net reduction in GHG emissions, the project would also contribute to reductions in cumulative GHG emissions.

Overall, the project would support California's EO B-55-18 mandate to achieve carbon neutrality by 2045 and net negative emissions thereafter, align with the CARB 2022 Scoping Plan strategies for increasing CO_2 removal and carbon capture, and comply applicable federal, State, and local policies. Furthermore, the project would not conflict with state goals to reduce GHG emissions.

Accounting for permanent CCS and the resulting GHG emissions reductions, the project's cumulative impacts would be less than significant. However, this is contingent upon injected CO_2 remaining in the identified geographically confined reservoirs for storage in perpetuity. Should the injected CO_2 fail to remain in the reservoirs in perpetuity, GHG emissions from the project would be potentially significant and the project would have the potential to conflict with GHG reduction plans. Implementation of MM 4.8-1 and MM 4.8-2 would greatly reduce the likelihood of CO_2 escaping from the reservoirs, but the possibility of a release due to unforeseen circumstances or equipment failure remains. As a result, the project's individual and cumulative impacts would remain significant and unavoidable.

Additionally, impacts from oil and gas development in Kern County on cumulative GHG emissions were determined to remain significant and unavoidable despite implementation of mitigation measures (Kern County Oil and Gas EIR). The analysis noted that the identified mitigation measures would encourage reduction in GHG emissions at a regional level but would not provide a mechanism guaranteeing GHG emission reductions on a cumulative basis. It was also noted that

Kern County lacks the jurisdiction and control over the many cumulative sources of GHG emissions, including the global source of GHG emissions, that collectively contribute to climate change. While the analysis acknowledged that many other agencies with the requisite jurisdiction are taking steps to reduce GHG emissions, the County could not assure that these steps would ultimately be implemented or sufficient to address global climate change. As a result, impacts from the project on cumulative GHG emissions in combination with impacts from oil and gas development in Kern County on cumulative GHG emissions would remain significant and unavoidable.

CEQA Guidelines Section 15130 notes that sometimes the only feasible mitigation for cumulative impacts may involve the adoption of ordinances or regulations rather than the imposition of conditions on a project-by-project basis. Global climate change is this type of issue. The causes and effects may not be just regional or statewide, they may also be worldwide. Given the uncertainties in identifying, let alone quantifying the impact of any single project on global warming and climate change, and the efforts made to reduce emissions of GHGs from the project through design, in accordance with CEQA Section 15130, any further feasible emissions reductions would be accomplished through CARB regulations adopted pursuant to AB 32.

In conclusion, Impact 4.8-3 would remain significant and unavoidable.

Mitigation Measures

Implement MM 4.8-1 through MM 4.8-6 as described above.

Level of Significance After Mitigation

Cumulative impacts would be significant and unavoidable.

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Section 4.9

Hazards and Hazardous Materials

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Section 4.9
Hazards and Hazardous Materials

4.9.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for hazards and hazardous materials in the project area. It also describes the project's potential impacts on sensitive receptors would result from implementation of the California Resources Corporation's (project proponent) proposed Carbon Terra Vault I (Kern County) Project (project) and identifies mitigation measures to address adverse impacts. The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the city of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

Information in this section is based in part on the California Air Resources Board (CARB) Low Carbon Fuel Standard (LCFS) Report #1 Site Based Risk Assessment prepared by California Resources Corporation (CRC) (CRC 2023) (Appendix F), and publicly available databases including the California Department of Toxic Substances Control's (DTSC) EnviroStor and State Water Resources Control Board's (SWRCB) Geotracker, and the Oil and Gas EIR. *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding oilfield environmental impacts and cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152).

A description of the environmental setting (affected environment) for hazards and hazardous materials is presented below in Section 4.9.2, *Environmental Setting*. The regulatory setting applicable to recreation is presented in Section 4.9.3, *Regulatory Setting*, and Section 4.9.4, *Impacts and Mitigation Measures* discusses project impacts and associated mitigation measures.

Hazards associated with seismic conditions are addressed in Section 4.7, *Geology and Soils*, of this EIR. Although this section does address the impacts of releases of hazardous materials, the impacts of the effects of potential releases relating to water quality and biological resources are also discussed in Section 4.10, *Hydrology and Water Quality*, and Section 4.4, *Biological Resources*, of this EIR.

4.9.2 Environmental Setting

This section defines the existing potential hazards within the project area to establish a baseline from which impacts associated with the project can be measured. A complete description of the project area including the regional location, project boundary, and surrounding land uses can be found in Chapter 3, *Project Description*, of this EIR. The environmental setting for hazardous materials, air traffic, disease vectors, fire hazards, and the unearthing or exposure of hazardous wastes and contaminated soil or groundwater that have the potential to affect human health are presented in this section.

Hazardous Materials and Waste

A hazardous material is any substance that, because of its quantity, concentration, or physical or chemical properties, may pose a hazard to human health and the environment. Under Title 22 of the California Code of Regulations (CCR), the term "hazardous substance" refers to both hazardous materials and hazardous wastes. Both are classified according to four properties: (1) toxicity; (2) ignitability; (3) corrosiveness; and (4) reactivity (CCR Title 22, Chapter 11, and Article 3). A hazardous material is defined in CCR, Title 22 as:

> A substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed (CCR, Title 22, Section 66260.10).

Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Hazards to human health and the environment can occur during production, storage, transportation, use, or disposal of hazardous materials.

The DTSC defines hazardous waste as a waste with properties that make it potentially dangerous or harmful to human health or the environment. They can be the by-products of manufacturing processes, discarded used materials, or discarded unused commercial products, such as cleaning fluids (solvents) or pesticides. In regulatory terms, a hazardous waste is a waste that exhibits one of the four characteristics of a hazardous waste: ignitability, corrosivity, reactivity, or toxicity. However, materials can be hazardous waste even if they are not specifically listed or do not exhibit any characteristic of a hazardous waste. For example, "used oil," products, which contain materials on California's M-list (which includes certain wastes known to contain mercury, materials regulated pursuant to the mixture or derived-from rules, and contaminated soil generated from a "clean up,") can also be hazardous wastes.

Transportation of Hazardous Materials

Hazardous materials could be shipped to, though, or from the project area within Kern County via truck or rail. Truck transportation of hazardous materials is commonly utilized for transporting

smaller quantities of a product compared to the volume of materials that could be transported by rail. Rail transportation of hazardous materials in the United States is a primary method of moving large quantities of chemicals over long distances.

There are no major highways that run in the vicinity of the project site. The nearest highway is State Route (SR) 58, a two-lane highway located approximately 2 miles northwest of the project. The transportation of hazardous materials within the state of California is subject to various federal, state, and local regulations. It is illegal to transport explosives or inhalation hazards on any public highway that is not designated for that purpose, unless the use of a highway is required to permit delivery or the loading of such materials (California Vehicle Code, Sections 31602 (b) and 32104(a)). The California Highway Patrol (CHP) restricts transportation of hazardous materials to specific routes. Information on CHP requirements and regulatory authority is provided in Section 4.9.3*, Regulatory Setting*, below. The following paragraphs provide more details about the modes of hazardous material transport in the project area. According to Section 2.5.4 of the Kern County General Plan (KCGP) Circulation Element, I-5 (approximately 12 miles east) is designated as an adopted commercial hazardous materials shipping route.

Hazardous Materials Used in Carbon Capture and Storage

Capture Facilities

The carbon dioxide (CO_2) capture facilities would utilize a traditional amine absorption process. Amines are classified as hazardous under the criteria of the federal Occupational Safety and Health Administration (OSHA) Hazard Communication Standard 29 Code of Federal Regulations [CFR] 1910.1200. Amines are harmful if swallowed and could cause severe skin burns and eye damage. Capturing CO_2 from existing stationary sources would utilize hazardous chemicals typical of an oil production and power generation facility. These chemicals include diluted amine, concentrated amine, caustic, sulfuric acid, calcium chloride, triethylene glycol, corrosion inhibitors, scale inhibitors, brominated biocide, sodium hypochlorite, and citric acid. Each of these chemicals are classified as hazardous under the criteria of the federal OSHA Hazard Communication Standard 29 CFR 1910.1200. Many of these chemicals are harmful if swallowed and could cause skin and eye damage.

Injection Well Drilling

To facilitate drilling and completions operations, temporary facilities, equipment, and materials may be set up and stored on the well pad (e.g., drilling mud supplies, water, drilling materials and casing, crew support trailers, pumps and piping, portable generators, field flares, fuels and lubricants). Containments (i.e., temporary pits, operations sumps, and/or portable tanks) may be set up to store drilling fluids, wellbore cuttings, and drilling wastes. Portable tanks may also be set up to mix and store other needed liquids or slurries, such as drilling fluids and completion fluids.

Table 4.9-1 provides a representative list of materials used in Kern County oil and gas drilling in 2014.

Table 4.9-1: Representative List of Potentially Hazardous Materials Used in Kern County Oil and Gas Drilling and Production in 2014 Excluding Well Stimulation

Type of Material	Examples of the Material Type
Aerosol	Degreaser, Paints
Compressed Gases	Acetylene, Air, Ammonium Chloride, Anhydrous Ammonia, Argon, Butane, Calibration Gas, CO_2, CO, Chlorine, Helium, Nitrogen, Oxygen, Ethane, Fire Extinguishing Agent, Hydrogen, Isobutane, Butane, Propane, Methane, Nitric Oxide, Mixed Gases Pentane, Sulfur Hexafluoride, Stargon, Welding Gas
Fuel, Oils, and Lubricants	Motor Oils (10/40, 30, 40, 80-90), Gear Oil/Grease/Gear Lube Oil Lube Oil, Synthetic Grease, Diesel (Clear, RRR, #1, #2, Red), Crankcase Oil, Gas Engine Oil (40, 80W90), Cylinder Oil, Compressor Oil, Rock Drill Oil, Turbine Oil, Hydraulic oil, Heat Tran/Oil, Industrial Oil, Jet Oil, Refrigeration Oil, Hydraulic Fluid
Liquid	Acetic Acid, Hydrochloric Acid, Citric Acid, Emulsifiers, Ammonium Products, Biocides, Anti Foam, Antifreeze, Urea Solution, Aromatic Fluid, Dispersant, Inhibitors, Bacteriacide, Corrosion Inhibitor, Demulsifier, Sulfur Scavenger, Water Clarifier, Scale Inhibitor, Water Additive, Degreaser, Emulsion Breaker, Biocide, Bleach, Flocking Agent, Reverse Emulsion Breaker, Reverse Demulsifier, Asphalt Emulsions, Caustic Soda Liquid, Chlorine, Chelant, Cleaner, Coolant, Defoamer, Anti-Sludging Agent, pH Balancer, Oxygen Scavenger, Cooling Water Treatment, Microbiocide, Paint, Ethylene Glycol, Ethyl Mercaptan, Glycol, H_2S Scavenger, Hydrogen Peroxide, Isopropanol, Isopropyl Alcohol, Naptha, Parafin Inhibitor, Methanol, Mineral Spirits, Paraffin Dispersant, Polymer, Radiator Fluid, Scale Remover, Soap, Sodium Hydroxide, Sodium Hypochlorite, Sulfide Scavenger, Sulfuric Acid, Surfactant, Triethylene Glycol, Water Clarifier
Liquid Solvent	Cleaning Solvents, Aromatic Solvent, Paraffin Solvent, Cleaning Solvent, Perchloroethylene, Petroleum Distillate, Safety Solvent, Solvents, Stoddard Solvents
Natural Gas	Compressed Natural Gas Liquefied Natural Gas
Natural Gas Condensate	Condensate Treater EA301
Radioactive	Calibration Nuclide V997, Well Logging Nuclide Cy4, Well Logging Nuclide
Solid	Shape Charges, Detonators, Blasting Caps, Polymers, Resins, Batteries, Bactericide, Ignitors, Barite, Acids, Breakers, Emulsifiers, Caustic Soda, Chelating Agents, Stabilizers, Coal, Corrosion Inhibitor, Crosslinkers, Catalysts, Dispersing Agents, Mercaptan, Surfactant, FLOCTREAT, Bulbs, Solvents, Gelling Agents, Graphite, Extender, Acids, Intensifier, Absorbents, Curing Agents, Anti Microbials, Diverting Agent, Wetting Agents, Oil Filters, Perlite, Explosives, Phase Treat, Polypropylene, Propellants, Primer Cord, Sack Black, SCALE TREAT, SCAVTREAT, Sludge, Soda Ash, Sodium Products, Degreaser

Source: Prepared from hazardous materials inventories obtained from the Kern County Environmental Health Division

Key:

CO = carbon monoxide

CO_2 = carbon dioxide

H_2S = hydrogen sulfide

Other nonhazardous materials used during oil and gas drilling include, but are not limited to, clays, sands, cements, diatomaceous earth, salts, cellulose, proppants, limestone, fire retardants, coal, fibers, gums, and fly ash.

Based on hazardous materials inventories obtained from Kern County Environmental Health Division (KCEH), Table 4.9-2 summarizes the maximum volumes and maximum container size of hazardous and acutely hazardous substances that are stored on site at oilfields in Kern County. Businesses in California must include a hazardous material inventory disclosure as part of their business plan. The chemicals in the hazardous materials inventory must be reported in gallons, pounds or cubic feet at standard temperature and pressure. The selected units for each substance are commodity based, reportable quantities or on how the material is stored.

Table 4.9-2: Maximum Daily On-Site Volumes

Substance	Maximum On-Site Volume	Maximum Container Volume
Produced Water	2,520,000 Gallons	840,000 Gallons
Crude Oil	12,096,000 Gallons	672,000 Gallons
Condensate	89,274,490 Pounds	9,916,100 Pounds
Natural Gas	25,316 Cubic Feet	25,316 Cubic Feet
Gasoline/Diesel	20,000 Gallons	10,000 Gallons
Acetic Acid	22,730 Pounds	2,640 Pounds
Sulfuric Acid 93%	750 Gallons	750 Gallons
Sodium Hydroxide	82,740 Gallons	42,000 Gallons
Explosives	4,000 Pounds	4,000 Pounds
Liquefied Natural Gas	19,000 Gallons	19,000 Gallons
Butane	808,500 Gallons	808,500 Gallons
Acutely Hazardous Materials		
Anhydrous Ammonia	16,500 Pounds	15,000 Pounds
Hydrochloric Acid	831,572 Pounds	15,000 Pounds
Oxygen Difluoride (compressed gas)	500 Cubic Feet	500 Cubic Feet
Acetic Acid 80% in Water (Kern County Environmental Health Division 2014- Peracetic Acid)	990 Gallons	55 Gallons

Source: Prepared from hazardous materials inventories obtained from Kern County Environmental Health Division

Hazardous Materials Used for Well Maintenance Activities

Maintenance activities performed on CO_2 injection wells may be required to remove wellbore and near-wellbore damage induced during well construction and injection operations. The well maintenance activities may require the use of chemicals such as hydrochloric acid, hydrofluoric acid, surfactants, and other aqueous or non-aqueous fluids. When chemical treatments are injected

into CO_2 injection wells, the chemicals are not returned back to surface. The chemicals are flushed from the wellbore into the reservoir where reactive chemicals are spent, and the inert fluid is sequestered permanently with the injected CO_2.

Non-Senate Bill (SB) 4 well maintenance activities are excluded from Well Stimulation Treatments (WST) by definition in SB 4. WST are not required to inject CO_2 and would not be performed in this project. Well stimulation can involve using pressure, heat, or chemicals to increase the flow of CO_2 into well. WST are designed to enhance injection or production in wells by increasing the permeability of the formation. WST operations are typically performed during initial well completion or workover operations. The operations are a short-term and non-continual process for the purposes of opening and stimulating channels for the flow of CO_2. The primary methods of WSTs used in Kern County are acid-based well stimulation and hydraulic fracturing. No stimulation by hydraulic fracturing would be performed in this project. Some of the same chemicals used in acid-based WST are also used in non-SB 4 routine maintenance activities, though not with intention to enhance reservoir permeability. Well maintenance activities utilized smaller volumes of chemicals designed only to remove damage within the wellbore and immediate vicinity and do not trigger the application of SB 4.

Hazardous Waste Generated During Oil and Gas Activities, Transport, and Disposal

Nonhazardous Oil and Gas Waste - Storage, Transport, Disposal

Solid and Liquid Wastes

During production, nonhazardous solid wastes fall into two categories: (1) drilling and other wastes associated with exploration and production; and (2) other wastes. This discussion addresses drilling wastes. Wastes, such as construction material and other solid wastes, are discussed in Section 4.19, *Utilities and Service Systems*.

Drilling sumps are used to collect drilling fluids and cuttings, also known as "drilling muds," which are produced during drilling operations. Drilling muds are nonhazardous. Drilling sumps are typically located adjacent to the well pad. Drilling muds must first be dried prior to back-filling. Operations sumps are used to store fluids and solids, which are produced during the life of the operational well as well as potential workover activities. Operations sumps can range from small pits located next to the well to centralized sumps that collect workover fluids at the well site and for transfer to centralized sumps for processing. The Central Valley Regional Water Quality Control Board permits the operations of drilling sumps pursuant to statewide general orders, while operations sumps are permitted through site specific Waste Discharge Requirements (WDR).

Produced Water

Drilling for oil and gas in California yields a mixture of oil, gas, and water from the formation; the water is separated from the oil and gas and stored in tanks and pits. This water is called "produced water" and is usually very brackish and unsuitable for human use. The water is commingled naturally in the same zone with the oil and natural gas. Produced water is brought up from the

formation during oil or gas production and is not considered a hazardous waste. Because it was commingled with hydrocarbons in the formation, the water typically contains chemicals associated with the formations, such as salts, oils and greases, inorganic and organic chemicals, and naturally occurring radioactive material, that exceed state and federal standards for drinking water.

Produced water is managed in a number of ways, including reinjection for disposal or reuse for other purposes, such as steam generation, to support oil and gas production operations. In standard reinjection operations, injection wells may be located within the oilfield. The oil is separated from the water and the water is reinjected into the same formation from which it was originally recovered. In other instances, the produced water may be trucked from treatment tanks on site to commercial injection facilities located apart from the oilfield operations.

Produced water may also be transported, via truck or pipeline to existing wastewater treatment facilities permitted to receive production water for disposal. Produced water collected in tanks is typically re-used for further extraction purposes, stored in surface impoundments where it percolates into groundwater and/or evaporates, or disposed of by injection well. The percolation ponds operate under WDRs issued by Central Valley Regional Water Quality Control Board (RWQCB). Some produced water requires treatment prior to disposal, and some produced water is treated and reclaimed for other purposes, as discussed further in Chapter 3, *Project Description*, Section 4.10, *Hydrology and Water Quality*, and Section 4.19, *Utilities and Service Systems*.

Waste Gas

Some of the produced gas stream associated with oil production may contain constituents that make it unsuitable for resale or use in on-site facilities. In these instances, the produced gas stream is gathered via small pipelines using a system of vapor recovery units. Waste gas can be transported via pipeline to a dedicated "waste gas" injection well that disposes of the gas into depleted oil reservoirs. Waste gas injection wells are permitted by the California Geologic Energy Management Division (CalGEM) as Class II injection wells. Waste gas may also be transported from the processing facility via pipelines and flared or used for fuel in steam generators.

There are thousands of feet of pipelines conveying oil and gas byproducts, including waste gas, throughout the project area. All such pipelines are subject to inspection and testing procedures as required by the CalGEM regulations adopted pursuant to Assembly Bill (AB) 1960 (see CCR, tit. 14, § 1774.1.). Under the regulations, "operators shall visually inspect all aboveground pipelines for leaks and corrosion" at least once per year. In addition, CalGEM may order any tests or inspections it deems necessary to establish the reliability of any pipeline system. Following pipeline inspection, repair, replacement, or cathodic protection may be required. Any pipeline that has had a leak in the past, resulting in the release of a reportable quantity, shall be pressure tested by the operator to verify the integrity of the pipe prior to being placed back into active service.

Consistent with the pipeline inspection requirements of the AB 1960 regulations, all operators are required to prepare a pipeline management plan for all pipelines, which lists information on each pipeline as well as a description of the testing method and schedule for all pipelines (see CCR, title 14, § 1774.2.). Moreover, all operators must establish and comply with a written preventative

maintenance plan for the prevention of corrosion and leakage, consistent with CCR, Title 14, Section 1777.

Accidents, Upsets, and Safety Issues

General Safety in the Carbon Capture and Storage (CCS) Sector

A review of incidents has been conducted to identify likely hazards associated with the proposed Project. There have been a number of industrial and natural releases of CO_2 where injuries and fatalities due to CO_2 inhalation have occurred. Below are details of some CO_2 incidents that illustrate the characteristics of CO_2 releases, and potential impacts on human health and safety, and the environment.

Significant incidents associated with underground natural gas storage, and steam injection into oil and gas production wells for enhanced oil recovery (EOR) have also been identified. These involve different hazardous materials, though both use similar technology for injection into oil and gas reservoirs.

2020 Satartia, Mississippi – 24-inch Pipeline Rupture

In 2007, a 31-mile CO_2 pipeline was built to connect the Tinsley oilfield near Satartia in Mississippi, to a naturally occurring CO_2 gas supply under Jackson, Mississippi for EOR, which ruptured in 2020. The following are the key points from the U.S. Department of Transportation (USDOT) Pipeline and Hazardous Material Safety Administration's (PHMSA's) Office of Pipeline Safety (OPS) – Failure Investigation Report (Appendix B-2).

In 2020, Denbury's 24-inch Delhi (Delhi) Pipeline ruptured, releasing liquid CO_2 that immediately began to vaporize at atmospheric conditions. The site of the rupture was on the northeast side of Highway 433, approximately one mile southeast of Satartia, Mississippi. Denbury subsequently reported the rupture released an estimated total of 31,4052 barrels of CO_2. Following the accident, investigators from the PHMSA's Failure Investigation Report and Southwest Regional Office, conducted an investigation, including an on-site investigation.

Key Points

- In 2020, a CO_2 pipeline operated by Denbury Gulf Coast Pipelines LLC (Denbury) ruptured in proximity to the community of Satartia, Mississippi. The rupture followed heavy rains that resulted in a landslide, creating excessive axial strain on a pipeline weld.
- CO_2 is considered minimally toxic by inhalation and is classified as an asphyxiant, displacing the oxygen in air. Symptoms of CO_2 exposure may include headache and drowsiness. Individuals exposed to higher concentrations may experience rapid breathing, confusion, increased cardiac output, elevated blood pressure, and increased arrhythmias. Extreme CO_2 concentrations can lead to death by asphyxiation.
- When CO_2 in a super-critical phase (which is common for CO_2 pipelines) releases into open air, it naturally vaporizes into a heavier than air gas and dissipates. During the

February 22 event, atmospheric conditions and unique topographical features of the accident site significantly delayed dissipation of the heavier-than-air vapor cloud. Pipeline operators are required to establish atmospheric models to prepare for emergencies—Denbury's model did not contemplate a release that could affect the Village of Satartia.

- Local emergency responders were not informed by Denbury of the rupture and the nature of the unique safety risks of the CO_2 pipeline. As a result, responders had to guess the nature of the risk, in part making assumptions based on reports of a "green gas" and "rotten egg smell" and had to contemplate appropriate mitigative actions. Fortunately, responders decided to quickly isolate the affected area by shutting down local highways and evacuating people in proximity to the release. Denbury reported on its PHMSA F 7000.1 accident report that 200 residents surrounding the rupture location were evacuated, and forty-five people were taken to the hospital. Denbury also reported that to the company's knowledge, one individual was admitted to the hospital for reasons unrelated to the pipeline failure. No fatalities were reported.
- This event demonstrated the need for:
  - Pipeline company awareness and mitigation efforts directed at addressing integrity threats due to changing climate, geohazards, and soil stability issues.
  - Improved public engagement efforts to ensure public and emergency responder awareness of nearby CO_2 pipeline and pipeline facilities and what to do if a CO_2 release occurs. This is especially important for communities in low-lying areas, with certain topographical features such as rivers and valleys.

2020 Yazoo County, Mississippi – A large release to atmosphere occurred due to a blowdown valve freezing open. Work was being conducted to reconnect the pipeline that had ruptured near Satartia in 2020. An 8-inch valve froze in the open position due to internal dry-ice formation as CO_2 flashed across the valve. A total of approximately 40,000 barrels (5,200 metric tons [MT]) of CO_2 were released over about 24 hours until the pipeline segment pressure had reduced enough to allow the valve to thaw and be closed. A large CO_2 cloud formed, and the nearby highway closed. Air monitoring was conducted in the surrounding area, and personnel kept at a safe distance.

2015 Aliso Canyon, California, Natural Gas Storage Injection Well Failure

The Aliso Canyon facility in Los Angeles County is one of the largest underground natural gas storage facilities in the United States. Natural gas is stored in a depleted oil and gas sandstone formation at approximately 8,500 feet below ground, with gas being injected and withdrawn through 115 operational wells at the time of the incident. In 2015, there was a well failure, and gas was detected to be leaking from the ground on the hillsides below the wellhead. This incident resulted in a sustained and uncontrolled natural gas leak of approximately 100 thousand tons of methane. Over 5,000 families had to be evacuated, and the well took three and a half months to control.

The well was operated by injection and withdrawal through both the tubing and casing. A single point failure of the well casing allowed gas to escape the well and travel through the rock formation to the surface. The configuration in which both tubing and casing are used for injection and

production is non-standard in the oil and gas industry, outside of the underground natural gas storage industry. Typically, oil and gas and production wells only produce fluid through the tubing and maintain isolation between the tubing and casing. Underground injection control (UIC) injection wells also operate in a similar configuration, where the casing serves as a secondary barrier to monitor for failures.

2013 Louisiana, Abandoned Well Underground CO_2 Blowout

In 2013, an underground CO_2 blowout occurred at the CO_2-EOR Delhi field in Louisiana, when two or more plugged and abandoned wells failed underground. Methane, CO_2, oil, water, brine and sands migrated to the surface in a sparsely populated, marshy area. The release lasted for more than six weeks and contaminated the air with CO_2 and methane.

2011 Mississippi, Abandoned Well CO_2 Blowout

In 2011, an improperly plugged and abandoned well failed at the CO_2-EOR Tinsley Field, Mississippi. There were incomplete records of abandoned wells at the site. A 2,000-foot-deep well failed when the reservoir pressure increased on injection of CO_2. The blowout took 37 days to bring under control, sickened one worker, and suffocated deer and other animals.

2008 Mönchengladbach, Germany Incident

During an accident in Mönchengladbach, Germany, in 2008, over 100 residents suffered from respiratory problems due to a CO_2 release, of which 19 were hospitalized. The incident involved the release of about 15 MT (90 barrels) of fire suppression CO_2 inside a factory, which leaked out of the building. At the time there was no wind, so the dense CO_2 cloud drifted down hill to the lowest lying region where there was a village about 1,500 feet away. The incident illustrated the hazards of CO_2 accumulation in calm or very low wind conditions, and flow of a dense cloud into lower lying areas.

2004 to 2011 In Salah CCS Project, Algeria

The In Salah CCS demonstration project in Algeria was the first commercial onshore facility to inject CO_2 into a depleted gas reservoir for permanent geological storage. Injection of CO_2 starting in 2004, into a 6,200 =-feet deep sandstone formation. During the project, 3.8 million metric tons (MMT) of CO_2 were injected. Extensive monitoring was conducted, including seismic analysis, sampling using gas tracers, downhole logging, surface gas monitoring and satellite data to monitor surface elevation changes. Monitoring results identified that CO_2 was potentially injected at a rate that caused well pressure to exceed the fracture pressure. Injection was suspended in 2011 after seven years of operations. To date, no leakage has been detected, though satellite monitoring detected deformation of land surfaces, and seismic monitoring indicated possible fracturing.

2002 CO_2 Storage Tank Explosion – Texas

A worker from Reliant Processing in Muleshoe, Texas, was killed when a CO_2 storage tank he was insulating exploded. The explosion was related to a build-up of excessive pressure and brittle fracture of two tanks due to extremely low temperatures. OSHA investigated this incident and

reported that the tanks were originally designed for liquefied petroleum gas (LPG) and not suitable for minimum CO_2 temperatures.

2000 U.S. Environmental Protection Agency Fire Suppression System CO_2 Incident Assessment

CO_2 has been used for many years in the special hazard fire protection industry worldwide. However, large quantities are needed to suppress a fire. The minimum CO_2 fire suppressant concentration is 34 percent, which is higher than the lethal concentration. In 2000, the U.S. Environmental Protection Agency (EPA) conducted an extensive research project to assess information on deaths, injuries and the risks associated with the use of CO_2 as a fire suppressant (50). From 1975 to 1999, a total of 51 CO_2 incidents were identified that reported a total of 72 deaths and 145 injuries resulting from the discharge of CO_2 from fire extinguishing systems. The main cause was found to be accidental discharge during maintenance or testing. Since the report was published, additional fatal incidents have occurred. The incident in 2008 at Mönchengladbach, Germany, described above was another example of an accidental fire suppressant release.

1988 Storage Tank Explosion, Germany

A similar incident occurred in Worms, Germany, in 1988. A catastrophic pressure failure occurred of a 30 MT capacity CO_2 storage tank due to the vessel relief valve icing up. Five weeks prior to the incident, the vessel had also been exposed to an extremely low temperature. The force of the explosion propelled the vessel nearly 1,000 feet and resulted in three fatalities and eight injuries.

1986 Lake Nyos, Cameroon

Lake Nyos is a volcanic lake which is naturally saturated with CO_2 leaking from the magma chamber below. In 1986, an estimated 1.6 MMT of CO_2 was suddenly released when the lake waters overturned. Over 1,700 people and 3,500 livestock were killed and thousands more were injured as the cloud travelled along the valley for more than 9 miles.

A similar incident occurred in 1984 at Lake Monoun when water overturned in the volcanic lake. The released CO_2 moved out of the crater and hung in a depression along a nearby river, where 37 people were asphyxiated.

The Lake Nyos incident illustrates the dangers of a large CO_2 release. However, the quantities of CO_2 released at Lake Nyos were several orders of magnitude larger than proposed for the CarbonFrontier CCS Project. The pipeline inventory is less than 1,000 MT, and each carbon capture facility contains a CO_2 inventory of less than 50 MT.

1982 Sheep Mountain, Loss of CO_2 Production Well Control

In 1982, a blowout occurred in Sheep Mountain, Colorado, during the drilling of a CO_2 production well into a natural reservoir at depths of 3,300 to 6,000 feet. The CO_2 release rate was estimated to be about 200 million standard cubic feet per day (120 kilograms per second [kg/s]). The high release rate made this a difficult well to kill, although industry now has a better understanding of managing the control of CO_2 wells.

1930's Crystal Geyser, Abandoned Well

Crystal Geyser in Utah is the largest cold geyser in the world. The geyser was unintentionally created in the 1930s after a prospective oil well was drilled about 2,600-foot-deep into a fault zone above a natural CO_2 reservoir. Shortly after drilling, the well was abandoned and not properly capped, allowing CO_2 to be released through the well.

Crystal Geyser eruptions last from 7 to 98 minutes with a release rate between 330 and 790 pounds per minute (2.5 and 6 kg/s). Downwind CO_2 concentrations have been measured during eruptions, averaging about 4,000 parts per million (ppm) (0.4 percent) at 160 feet, and 800 ppm at 330 feet. This analysis suggests that even large and rapidly escaping CO_2 from the geyser results in concentrations that are below human health and safety concerns.

Unauthorized Spills, Discharges, and Incidents

Pipeline Spills associated with PHMSA-Regulated Pipelines

Incidents meeting the reporting threshold for USDOT regulated pipeline systems are reported to the PHMSA of the USDOT. The PHMSA database has been searched for incidents involving pipeline transportation of dense phase CO_2 during the 20-year period, 2002 to 2021. A total of 100 records were identified, 25 associated with line pipe, and an additional 75 associated with auxiliary equipment such as valves, meter stations, and pressure relief. The releases were categorized by the size of release and mode of failure, in order to assess the likelihood of release.

Releases have been categorized by following sizes:

- Pinhole: Failure size smaller or equal to the area of a 0.5-inch-diameter hole
- Crack/Hole: Effective diameter of the failure greater than 0.5 inches and less than the pipeline diameter
- Rupture: Effective failure size the diameter of the pipeline or greater

To ensure consistency within the PHMSA database and for comparison with other data sources, releases reported to the PHMSA were re-categorized based on the size of the leak or hole as defined above. For example, some records indicated rupture events which were clearly not full bore ruptures from the reported hole dimensions and release quantities. Some PHMSA release cause categories were changed in 2010, so adjustments were made for consistency.

The total length of CO_2 pipelines in operation for each year from 2002 to 2021 has been summed from annual USDOT reports submitted by pipeline operators. U.S. operating experience over the 20 years totals 91,000 mile-years. The likelihood of failure has been calculated by release size per 1,000 mile-years of pipeline operation as shown in Tables 4.9-3 and 4.9-4:

Table 4.9-3: USDOT CO_2 Pipeline Data for Years 2002 to 2021

Pipe Release Size	Number of Pipe Release	%	Average Release Size (bbl)	Failure Rate per 1,000 mile-years
	15	60	17	0.164
Pinhole	9	36	105	0.098
Crack/Hole	1	4	9,532	0.011
Rupture	**25**			**0.273**
Total	**25**			**0.273**

The number of incidents and pipeline operating miles is limited, and therefore the failure rates have a high degree of uncertainty. For example, an incident in 2018 involved the failure of a girth weld. The pipeline was out of service due to maintenance activities and being refilled at the time of failure. If operational, this would likely have resulted in a total rupture of the pipeline, doubling the calculated rupture failure rate above.

Dense phase CO_2 transmission pipelines typically operate at pressures between 1,200 and 2,200 pounds per square inch gauge (psig), with an average maximum allowable operating pressure of about 2,000 psig. The CO_2 pipeline diameters range from 4 to inches, with an average of 17 inches. The average pipeline age is currently 27 years.

Releases associated with pipeline auxiliary equipment have been categorized by the type and size of leak as shown in Table 4.9-4:

Table 4.9-4: USDOT CO_2 Pipeline System Data for Years 2002 to 2021

Auxiliary Equipment Releases	Number of Release	%	Average Release Size (bbl)
Auxiliary Equipment on Mainline Pipeline, in Right-Of-Way			
Mainline Valve /Flange Leaks	10	13	55
Mainline Relief Valve Failure / Leak	4	5	1,347
Mainline Connection Failure	4	5	2,450
Mainline Auxiliary Valve Frozen	1	1	41,177
Pump / Meter Station Equipment			
Valve / Flange / Weld Leaks	28	37	9
Connection Failure	3	4	8
Pig Launcher / Receiver Leak	7	9	63
Relief Valve Failure / Leak	18	24	261
Total	**75**		

Key:
bbl = barrels
CO_2 = carbon dioxide
USDOT = U.S. Department of Transportation

Releases associated with auxiliary equipment were typically small flange or valve leaks. Medium sized releases occurred due to the failure of relief valves or connection failures. Approximately 75 percent of these occurred on operator-controlled sites.

The causes of pipeline and auxiliary equipment releases have been categorized as shown in Table 4.9-4. The predominant causes of failure associated with line pipe are external corrosion (40 percent) and material failure (48 percent). The predominant causes of failure associated with auxiliary equipment are gasket and seal leaks, malfunction of control or relief valves, and construction failure.

Over the last 20 years, there have been two major CO_2 pipeline releases in the United States:

- 2020 Satartia, Mississippi - Guillotine failure of 24-inch CO_2 transmission pipeline due to ground movement after heavy rains. This incident is described above in Section 4.9.2.
- 2020 Yazoo County, Mississippi – A large release to atmosphere occurred due to a blowdown valve freezing open. Work was being conducted to reconnect the pipeline that had ruptured near Satartia in February 2020. An 8-inch valve froze in the open position due to internal dry-ice formation as CO_2 flashed across the valve. A total of approximately 40,000 barrels (5,200 MT) of CO_2 were released over about 24 hours until the pipeline segment pressure had reduced enough to allow the valve to thaw and be closed. A large CO_2 cloud formed, and the nearby highway closed. Air monitoring was conducted in the surrounding area, and personnel kept at a safe distance.
- USDOT pipeline incident reports describe releases of CO_2 to have been identified by either flow monitoring equipment, or a visible cloud. Large pipeline failures were identified by supervisory control and data acquisition (SCADA) monitoring systems, which initiated shutdown and isolation of mainline valves. A SCADA system would not be able to detect small leaks, but due to the very low temperature on release, these are likely to be detected by the public or employees. Small above ground releases have been identified as a result of ice forming on equipment, or the sound of vapor release due to the high pressure drop, or a low laying vapor cloud formed by moisture condensing. Below ground leaks have been reported as a result of vapors seen at ground level, or ice forming on the ground above a leak. One report described the ground heaving above a CO_2 pipeline due to a 4-foot ball of dry ice below the surface.

No significant injuries or fatalities have occurred due to CO_2 pipeline incidents. The Satartia pipeline rupture in February 2020 resulted in a total of 200 residents being evacuated and 45 residents taken to the hospital. No residents were admitted due to hazardous material exposure.

Use of Underground Injection Wells

There is insufficient operating experience with EPA UIC Class VI injection wells to predict the likelihood of failure from historical events, and to date, no well blowouts have been reported at dedicated storage sites. However, CO_2 has been injected into active oil and gas production formations for EOR since 1972. A search of incident data has been conducted to identify significant releases that have occurred, and assess potential consequences associated with the failure of CO_2

injection wells. However, EOR has been prohibited in California in association with Carbon Capture and Storage and would not be used in this project. This information is intended to provide facts about failures in CO_2 wells under various circumstances.

Loss of well control events are not normally reported to the National Response Center (NRC) or federal agencies, unless there is an off-site impact. A search of Texas well reports identified four blowouts associated with CO_2-EOR wells over a 10-year period, 2012 to 2021. These were due to wellhead equipment failure, three of which were during well workovers.

Releases may also occur due to a well bore leak and migration to the surface, either through the overlaying formation, or via a poorly abandoned well. These incidents result in a slower release which would be detected by monitoring and unlikely to cause an acute health hazard.

Incidents associated with CO_2-EOR and analogous underground natural gas storage (UNGS) facilities reported in the media include:

- 2016 – Cordona Lake, Texas. A faulty wellhead failed, releasing CO_2 about 20-feet into the air. Hydrogen sulfide (H_2S), CO_2 and hydrocarbon monitoring was conducted, and no hazardous concentrations were detected.
- 2015 – Gaines, Texas. A CO_2-EOR injection well head failure occurred during well maintenance. The failure caused a blowout and 25 local homes had to be evacuated for nearly a week. There were no reports of injuries. Most concerns were associated with exposure to H_2S, which was present in the CO_2.
- 2015 – Aliso Canyon UNGS, California. Well casing failure allowed gas to escape the well and travel through the rock formation to the surface. Over 5,000 families had to be evacuated, and the well took three and a half months to control.
- 2001 – Yaggy UNGS Facility, Kansas. Natural gas was injected for storage into salt caverns at a depth of 600 to 900 feet. An injection / production well casing failed, leaking gas into the rock formation. The gas migrated approximately nine miles underground, and then traveled to the surface through several abandoned brine wellbores. The released gas caused two gas explosions in Hutchinson, Kansas, destroyed buildings and killed two persons in a mobile home park.

Reports of CO_2 blowouts via the well bore indicate that these incidents may be a concern for acute risks in the local vicinity if close to residents and highways, although releases have mainly dissipated quickly. Well bore leaks may also occur, and migrate through the rock formation to the surface. Well casing leaks are likely to migrate slowly to the surface without causing acute health hazards, although these may cause serious hazards if migration to the surface is via an idle or improperly abandoned well.

Historical Property Use

The project area is largely characterized by existing oil and gas related operations, the Elk Hills Power Plant and related infrastructure. The area is currently an active oilfield, with 344 wells being

managed at Elk Hills oilfield. Of these wells, 143 are active, 125 are idle, and 76 are abandoned. The surrounding area is comprised of agricultural fields, both active and fallow, and other existing oilfields. They include the Midway/Sunset oilfield, McKittrick oilfield and Cymric oilfield. Skyline Road is closed to public entry and is the southern boundary of the project.

Hazardous Materials Release Sites in the Area – Cortese List

A records search was conducted of government databases compiled pursuant to the State of California Hazardous Waste and Substances Sites (Cortese) List (Government Code §65962.5) to identify any government listed hazardous materials or waste sites located on or within a 1-mile radius of the project area. This database search included sites that did not necessarily contain contaminated soil or groundwater but were identified in federal or state databases for compliance with or enforcement of environmental regulations. A search was conducted on November 16, 2023. According to a review of the DTSC EnviroStor database, there are two hazardous release sites located within one mile of the project site (DTSC 2023a). The SWRCB GeoTracker database identified three Cleanup Program Sites located within one mile of the project site (SWRCB 2023a). A brief summary of the relevant information obtained is listed below.

- Occidental of Elk Hills Inc (80001254): This site is located in Assessor Parcel Number (APN) 158-090-01 (DTSC 2023b).
- California Resources Elk Hills LLC (CA4170024414): This site is located in APN 158-090-01 (DTSC 2023c).
- 27R Waste Management Complex, Elk Hills oilfield (T10000002777): Cleanup Program Site list as Open – Assessment & Interim Remedial Action. This site is located in APN 158-090-01. This oilfield facility led to soil contamination from arsenic, chromium, crude oil, and polynuclear aromatic hydrocarbons (SWRCB 2023b).
- California Resources Corporation - Elk Hills oilfield - Section 35R (T10000016467): Cleanup Program Site list as Open – Site Assessment. This site is located in 158-090-19. This facility led to surface/structure, soil, and surface water contamination from per- and polyfluoroalkyl substances (SWRCB 2023c).
- Former Naval Petroleum Reserve No. 1 Closure Project (Elk Hills) (T10000010089): Cleanup Program Site list as Open – Assessment & Interim Remedial Action. This site is located in 158-090-19. This facility includes approximately 55 sumps that are listed under WDR 59-491; 73-141; and 73-42 (SWRCB 2023c).

Schools

The County is served by 46 K-12 school districts (KCSS 2022a). The project site is within the McKittrick, Buttonwillow Midway school district boundaries (KCSS 2022b). The closest schools to the project site are McKittrick Elementary School, Buttonwillow Elementary School, and Elk Hills Elementary School. These schools are located approximately within 3 miles of the CUP boundary, and specific distances to each project element are listed in Table 4.9-5.

Table 4.9-5. Active Schools in Proximity to the Project Site

School Name	Student Population (2022–2023)	District	Distance to CUP Boundary (miles)	Distance to Injection Well (miles)	Distance to Facility Pipeline (miles)
McKittrick Elementary School	79	McKittrick Elementary	2.78	4.47	4.47
Buttonwillow Elementary School	313	Buttonwillow Union Elementary	4.85	6.15	5.81
Elk Hills Elementary School	163	Elk Hills Elementary School	4.21	6.05	6.05
Midway Elementary	85	Midway Elementary	7.04	8.11	7.98
Jefferson Elementary	243	Taft City	6.73	8.15	8.13
Taft Primary	247	Taft City	7.61	9.02	9.01
Roosevelt Elementary	475	Taft City	7.29	8.65	8.63
Parkview Elementary	330	Taft City	8.00	9.45	9.35
Conley Elementary	312	Taft City	8.48	9.95	9.87
Lincoln Junior High	795	Taft City	7.28	8.75	8.63
Taft Union High	1,102	Taft Union High	7.36	8.83	8.78
Buena Vista High (Continuation)	84	Taft Union High	7.10	8.59	8.54
Taft College	3,943	West Kern Community College	7.15	8.51	8.55

Key: CUP = Conditional Use Permit

Airports

The nearest airport to the project site is the Elk Hills-Buttonwillow Airport, a public airport located approximately 2 miles northeast of the project site. The project site is not located within any safety or noise contour zone for this airport, nor is the project site located within a designated Kern County Airport Land Use Compatibility Plan (ALUCP).

Fire Hazard Areas

The California Department of Forestry and Fire Protection (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. The project site is not within an area identified by CAL FIRE as having high or very high fire risk (CAL FIRE 2022). Impacts related to wildfire hazards are further discussed in Section 4.20, *Wildfire*, of this EIR.

Disease Vectors

A disease vector is an insect or animal that carries a disease-producing micro-organism from one host to another. The Federal Insecticide, Fungicide and Rodenticide Act defines the term vector as "…any organism capable of transmitting the causative agent of human disease or capable of producing human discomfort or injury, including mosquitoes, flies, fleas, cockroaches, or other insects and ticks, mites or rats."

The accumulation of organic wastes would act as attractors for various vectors. In addition, any depressed areas, ponds, or drainage channels would provide areas for the breeding of mosquitoes.

Mosquitoes

Mosquitoes are of particular concern because of their abundance and distribution. In Kern County, mosquitoes are most abundant and active between May and October. Mosquitoes require standing water to breed and can be prolific in areas with standing water, such as wetlands.

Adult female mosquitoes can deposit eggs in a variety of aquatic habitats and other sources that contain water. The immature stages of each mosquito species develop in particular habitats. In general, there are four mosquito habitat groups: agricultural, industrial, domestic, and natural sources. Typical sites within these habitat groups include:

- Agricultural Sources: irrigated pastures, dairies, and orchards.
- Industrial Sources: sewage treatment ponds and drain ditches.
- Domestic Sources: containers, debris in and around ponds, bird baths, pet watering dishes, animal troughs, septic tanks, catch basins, roadside ditches, leaky sprinkler systems, and stagnant swimming pools.
- Natural Sources: wetlands, floodplains, and rain pools.

All species of mosquitoes require standing water to complete their growth cycle. Therefore, any standing body of water represents a potential mosquito breeding habitat. Although mosquitoes typically stay close to suitable breeding habitat and blood-meal hosts, they are known to travel up to 10 miles under breezy conditions. The breeding period for mosquitoes depends on temperature but generally occurs in March through October.

Water quality also affects mosquito reproduction. Generally, poor-quality water (e.g., water with limited circulation, high temperature, and high organic content) produces greater numbers of mosquitoes than high-quality water (e.g., water with high circulation, low temperature, and low organic content). Typically, water bodies with water levels that slowly increase or recede produce greater numbers of mosquitoes than water bodies with water levels that are stable or that rapidly fluctuate.

In Kern County, the Kern Mosquito and Vector Control District is responsible for vector control; however, there is no established vector control district in the area of Kern County where the project would be located.

Mosquito Hazards

Mosquito-Borne Diseases

Mosquitoes are known to be the carriers of many serious diseases.

West Nile virus is the most important mosquito-borne disease affecting Kern County. In 2023, there were 324 human West Nile virus infections in California and 10 deaths (CDPH 2023). Of these cases, 15 (4.6 percent) were in Kern County.

In September 2002, the Kern County Department of Health formed a West Nile Virus Task Force and has subsequently released reports documenting cases, developed strategies to prevent the occurrence of West Nile virus, and generated public education information, such as information pamphlets. Statewide, there are 52 local agencies, including local mosquito abatement districts and the California Department of Health Services Arbovirus Field Testing Stations, which work cooperatively to routinely conduct surveillance and control of mosquitoes and the diseases they transmit throughout California.

Mosquito Species of Concern

In Kern County, two species of mosquito are primary targets for suppression. These two species, *Culex pipiens quinquefasciatus* and *Culex tarsalis*, are potential vectors of encephalitis and West Nile virus. Other species of mosquitoes exist in Kern County that can cause a substantial nuisance in surrounding communities, but the *Culex* mosquito is the primary vector species of concern.

Although the West Nile virus can be transmitted by a number of mosquito species, *Culex* is the most common carrier. This disease is thought to be a seasonal epidemic that flares up in the summer and fall. West Nile virus is spread when mosquitoes that feed on infected birds bite humans and other animals.

The encephalitis mosquito (*Culex tarsalis*) breeds in almost any freshwater pond. Birds appear to be the primary blood-meal hosts of this species, but the insect will also feed on domestic animals and humans (Bohart and Washino 1978). This species is the primary carrier in California of western equine encephalitis, St. Louis encephalitis, and California encephalitis, and is considered a significant disease vector of concern in the state.

The house mosquito (*Culex pipiens quinquefasciatus*) usually breeds in waters with a high organic material content. This species is often identified by its characteristic buzzing. Although its primary blood-meal host is birds, the house mosquito may also seek out humans. The house mosquito is a vector of St. Louis encephalitis.

Flies

Nuisance flies have a life cycle comprised of an egg stage, three larval stages, a pupal stage, and an adult stage. Eggs are laid by a mature female fly onto a substrate appropriate for larval development. A single female can lay hundreds of eggs during her life. Nuisance fly larvae (grubs) are generally white in color and are blunt ended. They develop in wet substrates, especially dung pats and manure and wet or rotting feed, hay, and bedding straw, where they feed on food particles found on the substrate. Fly larvae are not capable of developing in truly aqueous habitats; they need wet, but not overly wet, substrates.

Within the confines of a pupal case, the developing fly will undergo further changes to become a winged adult fly that will eventually emerge from the pupal case and disperse from the site. The length of time required to complete the development from egg to adult is temperature dependent and may be as short as seven days during the summer months in California.

Some nuisance flies are blood feeders and can inflict a painful bite while feeding on animals or humans. Blood feeding (or biting) flies include the stable fly and horn fly. Other flies do not bite (non-biting flies), instead feeding on body secretions or liquefied organic matter. Non-biting flies include the house fly, face fly, and garbage fly.

Adult flies are generally active during daylight hours and inactive at night. Nuisance flies are known to disperse from their development sites into surrounding areas; however, the distance and direction of dispersal are not well understood. Non-biting nuisance fly species are likely to disperse further than those fly species that require animal blood meals. The habitat surrounding a breeding site will play a role in the distance of nuisance fly dispersal. Nuisance flies will likely disperse further in open habitats typical of rangeland and low agricultural crops than they will in urban or forested/orchard areas that contain substantially more vertical structure on which flies may rest and that provide shade and higher humidity on hot summer days.

Most nuisance flies are not known to disperse great distances. Studies using marked house flies show that 60 percent to 80 percent of house flies were captured within 1 mile of their release point; 85 percent to 95 percent were caught within 2 miles of the release site within the first four days after they were turned loose. A few flies have been shown to travel further, but in general, fly control efforts for a community problem are focused within 1 mile of the source.

Rodents

The accumulation of organic waste presents the potential for significant populations of mice and rats. Rodents can spread or accelerate the spread of disease from contaminated areas to uncontaminated areas via their droppings, feet, fur, urine, saliva, or blood. In addition, mice provide a food source that could attract wild predatory animals (e.g., skunks, foxes, coyotes, and stray dogs), which could pose other disease problems.

Mice are generally nocturnal and secretive animals with keen senses of taste, hearing, smell, and touch. They are small enough to enter any opening larger than one quarter of an inch. Mice prefer cereal grains, if available, but will eat garbage, insects, meat, and even manure. Mice reproduce at high rates, making early control important in minimizing the potential for infestation. Although the life span of a mouse is only nine to 12 months, a female mouse can have five to 10 litters per year with five or six young in each litter. Mice do not consume large quantities of food but can cause significant economic damage due to physical structure damage and site contamination.

4.9.3 Regulatory Setting

Federal

U.S. Environmental Protection Agency (EPA)

The EPA was established in 1970 to consolidate in one agency a variety of federal research, monitoring, standard-setting, and enforcement activities to ensure environmental protection. The EPA's mission is to protect human health and to safeguard the natural environment - air, water, and land - upon which life depends. The EPA works to develop and enforce regulations that implement environmental laws enacted by Congress, is responsible for researching and setting national standards for a variety of environmental programs, and delegates to states and tribes the responsibility for issuing permits and for monitoring and enforcing compliance. Where national standards are not met, the EPA can issue sanctions and take other steps to assist the states and tribes in reaching the desired levels of environmental quality.

Comprehensive Environmental Response, Compensation, and Liability Act/Superfund Amendments and Reauthorization Act

CERCLA, commonly known as Superfund, was enacted by Congress on December 11, 1980. This law (United States Code [U.S.C.] Title 42, Chapter 103) provides broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA establishes requirements concerning closed and abandoned hazardous waste sites; provides for liability of persons responsible for releases of hazardous waste at these sites; and establishes a trust fund to provide for cleanup when no responsible party can be identified. CERCLA also enables the revision of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The NCP (40 CFR, Part 300) provides the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, and/or contaminants. The NCP also established the National Priorities List. CERCLA

was amended by the Superfund Amendments and Reauthorization Act (SARA) on October 17, 1986.

Emergency Planning and Community Right-to-Know Act

Under the Emergency Planning and Community Right-to-Know Act, or Title III of the SARA, the EPA requires local agencies to regulate the storage and handling of hazardous materials and requires development of a plan to mitigate the release of hazardous materials. Businesses that handle any of the specified hazardous materials must submit to government agencies (i.e., fire departments or public health departments), an inventory of the hazardous materials, an emergency response plan, and an employee training program. The business plans must provide a description of the types of hazardous materials/waste on site and the location of these materials. The information in the business plan can then be used in the event of an emergency to determine the appropriate response action, the need for public notification, and the need for evacuation.

In 1990, Congress passed the Pollution Prevention Act which requires facilities to report additional data on waste management and source reduction activities to the EPA under the Toxics Release Inventory Program. The goal of the Toxics Release Inventory is to provide communities with information about toxic chemical releases and waste management activities and to support informed decision making at all levels by industry, government, non-governmental organizations, and the public.

Clean Water Act/Spill, Prevention, Control, and Countermeasure Rule

The Clean Water Act (CWA) (33 USC Section 1251 et seq.) was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). In California, NPDES permitting authority is delegated to, and administered by, the nine RWQCBs. The project is within the jurisdiction of the Central Valley RWQCB. Section 402 of the CWA authorizes the California SWRCB to issue NPDES General Construction Storm Water Permit (Water Quality Order 99-08-DWQ), referred to as the "General Construction Permit." Construction activities can comply with and be covered under the General Construction Permit provided that they:

- Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies best management practices (BMPs) that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving off-site into receiving waters.
- Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the nation; and

- Perform inspections of all BMPs. NPDES regulations are administered by the RWQCB.
- Projects that disturb one or more acres are required to obtain NPDES coverage under the Construction General Permits.

Other federal regulations overseen by the EPA relevant to hazardous materials and environmental contamination include Title 40 CFR Chapter 1, Subchapter D – Water Programs and Subchapter I – Solid Wastes. Title 40 CFR Chapter 1, Subchapter D, Parts 116 and 117 designate hazardous substances under the CWA. Title 40 CFR Part 116 sets forth a determination of the reportable quantity for each substance that is designated as hazardous. Title 40 CFR Part 117 applies to quantities of designated substances equal to or greater than the reportable quantities that may be discharged into waters of the United States.

The Safe Drinking Water Act of 1974 (42 U.S.C. §300f et seq.)

The Safe Drinking Water Act (SDWA) regulates the amount of toxic substances in drinking water sources. The SDWA requires the EPA to develop minimum federal requirements for UIC programs and other safeguards to protect public health by preventing injection wells from contaminating an underground source of drinking water (USDW). The UIC sections are:

1421 – Identifies what state regulations must include in their UIC program.

1422 – Outlines the process for state primacy applications including timelines and public participation requirements.

1423 – Sets forth enforcement of the program.

1425 – Describes optional demonstrations a state may make for the portion of the UIC Program relating to oil and natural gas operations.

1426 – Requires the administrator to determine the applicability of monitoring methods.

1431 – Authorizes emergency powers for EPA to take action in a state if there is an imminent and substantial endangerment.

1442 – Addresses the EPA's authority to conduct research, studies, training and demonstrations, specifically looking at improved methods for protecting USDWs.

1443 – Establishes grants for primacy programs.

The EPA developed the UIC Program requirements, but states, territories, and tribes can obtain primary enforcement responsibility, or primacy. State regulations must be as stringent as federal requirements but may be more stringent.

Pipelines

United States Department of Transportation

The USDOT was established by an act of Congress in 1966. It is mandated to oversee hazardous liquid pipeline safety under the U.S.C. Title 49, Chapter 601. PHMSA acting through the OPS administers the national regulatory program to ensure the safe transportation of refined petroleum products and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities in conjunction with the Technical Hazardous Liquids Pipeline Safety Standards Committee, which provides peer review.

Many of these regulations are written as performance standards, which set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. Pipelines are inspected and monitored by the western region of the PHMSA or by the state delegated officials. Inspectors conduct inspections during construction to ensure that the design, materials, construction methods, welding procedures, and testing meet the USDOT standards. Following construction, PHMSA inspectors inspect the pipeline. The inspections include a review to ensure compliance with 49 CFR 195, specifically, the inspections review the operation and maintenance procedures, abnormal and emergency operating procedures, damage prevention and public education procedures, and the inspection ensures the pipeline repair and operations are in compliance.

The National Response Framework (NRF) is part of the National Strategy for Homeland Security. The NRF formally replaced the National Response Plan in March 2008. Building on the principles outlined in the National Incident Management System, as well as the Incident Command System, the NRF's coordinating structures are effective procedures for the coordination of any level at any time, for the response activities among federal, state, and local response agencies (e.g., police, firefighting, emergency management, and first responder). The Oil and Hazardous Materials Incident Annex (Emergency Support Function #10) of the NRF directs the federal, state, and local authorities to conduct training, plan and execute field exercises, share lessons learned, and, in general, develop and maintain specific procedures for responses to incidents of regional and national significance.

Transportation of Hazardous Liquids by Pipeline, 49 CFR 195, includes detailed requirements on a range of safety and environmental protection issues related to liquids pipelines. Part 195.30 incorporates many of the applicable national safety standards of the American Petroleum Institute (API), American Society of Mechanical Engineers, American National Standards Institute, and American Society for Testing and Materials. Table 4.9-6 lists portions of 49 CFR 195 that are relevant to this Project.

Table 4.9-6: Key Elements of the Transportation of Hazards Liquids by Pipeline Regulations

Component of 49 CFR 195	Key Elements and Thresholds; Applicable Permits
Part 195.50 Reporting Accidents	Requires reporting of accidents by telephone and in writing for: • Explosion or fire not intentionally set by the operator; • Spills of five gallons or more or five barrels if confined to company property and cleaned up promptly; • Daily loss of five barrels a day to the atmosphere; • Death or injury necessitating hospitalization; or • Estimated property damage, including cleanup costs, greater than $50,000
Subpart C Design Requirements Parts 195.100 through 195.120	Design requirements for the temperature environment, variations in pressure, internal design pressure for pipe specifications, external pressure and external loads, new and used pipe, valves, fittings, and flanges, internal inspection devices
Subpart D Construction Parts 195.200-195.266	Construction requirements for standards such as compliance, inspections, welding, siting and routing, bending, welding and welders, inspection and nondestructive testing of welds, external corrosion and cathodic protection, installing in-ditch and covering, clearances and crossings, valves, pumping, breakout tanks, and construction records
Subpart E – Pressure Testing Parts 195.300-195.310	Minimum requirements for hydrostatic testing, compliance dates, test pressures and duration, test medium, and records
Subpart F-Operation and Maintenance Parts 195.400-195.466	Minimum requirements for operating and maintaining steel pipeline systems, including: • Correction of unsafe conditions within a reasonable time; • Procedural manual for operations, maintenance, and emergencies; • Training; • Maps; • Maximum operating pressure; • Communication system; • Cathodic protection system; • External and internal corrosion control; • Valve maintenance; • Pipeline repairs; • Overpressure safety devices; • Firefighting equipment; and • Public education program for hazardous liquid pipeline emergencies and reporting

Gathering lines are small diameter pipelines that transport petroleum products or natural gas from a production facility or wellhead to a central collection point. They often operate at relatively low pressures and flow, and are significantly smaller in diameter than transmission lines. Gathering

lines in rural oilfield settings are regulated by CalGEM under the AB 1960 regulations. The PHMSA regulates gathering lines for hazardous liquids in non-rural areas. Rural gathering lines for hazardous liquids are regulated if they are of a certain size and pressure and are located within a ¼ mile of unusually sensitive areas, such as key drinking water sources or critical ecological communities. Operators must determine if an onshore pipeline (or part of a connected series of pipelines) is an onshore gathering line using the API Recommended Practice 80, "Guidelines for the Definition of Onshore Gas Gathering Lines," (first edition, April 2000). This is done using criteria that determine when a gas gathering pipeline is close enough to a number of homes or areas/buildings where people congregate, in which an accident on the pipeline could impact them. If the criteria are met, these natural gas gathering pipelines, that operate at lower pressures, must comply with a subset of the requirements specified in 49 CFR 192.9. This section contains the required gathering line information for the operators of on-shore, off-shore, Type A, or Type B lines. An operator of a new, replaced, relocated, or otherwise changed line must be in compliance with the applicable requirements in this section by the date the line goes into service.

Pipeline Safety Improvement Act

In 2002, the U.S. Congress passed the Pipeline Safety Improvement Act (PSIA) of 2002, HR 3609, to strengthen the nation's pipeline safety laws. Under the PSIA, gas transmission operators are required to develop and follow a written integrity management program containing all the elements described in Part 192.911 of the USDOT regulations (49 CFR) to address the risk on all transmission pipeline segments of High Consequence Areas (HCAs). Specifically, the law establishes an integrity management program that applies to all HCAs.

The USDOT's OPS outlines pipeline design requirements that are based on population density in the region and, generally, more stringent design requirements correspond to areas with higher population densities (49 CFR 192.1). Areas in the vicinity of the pipeline are divided into "class location units." A unit is defined in 49 CFR 192 as "an on-shore area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline." Class location units are therefore confined to the area within 660 feet of 1 mile of contiguous pipeline. Class location units are considered HCAs if the area contains 46 or more buildings intended for human occupancy; is within 100 yards of either a building, or a small well-defined outside area, such as a playground, recreation area, outdoor theater, or other place of public assembly; or where buildings with four or more stories aboveground are prevalent.

Hazardous Liquid Pipeline Safety Act

The Hazardous Liquid Pipeline Safety Act of 1979 and amendments authorize the USDOT to regulate pipeline transportation of hazardous liquids (including crude oil, petroleum products, anhydrous ammonia, and CO_2). Key elements of the Hazardous Liquid Pipeline Safety Act of 1979 and amendments are summarized below in Table 4.9-7.

Table 4.9-7: Key Elements of the Pipeline Safety Regulations

Law/Regulation	Key Elements
Federal	
Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006 (PIPES- Public Law 109-468, December 2006)	Provides for advanced safety and environmental protection in pipeline transportation. Increases the transparency of pipeline safety evaluation. Provides funding for future pipeline safety studies.
Pipeline Safety Act of 1994 49 U.S.C. § 60101 et seq.	Defines the framework for pipeline safety regulation in the United States.
49 CFR Part 195- Transportation of Hazardous Liquids by Pipeline	This section describes the safety standards and reporting requirements for hazardous liquid pipelines. These regulations include detailed requirements on a range of topics related to the safety and environmental protection. This section also includes the minimum requirements for operator qualification of individuals performing tasks required by the regulations.

Key:
CFR = Code of Federal Regulations
U.S.C. = United States Code

Hazardous Waste Handling Requirements

Hazardous Materials Transportation Act (P.L. 93-933, January 1975)

The Hazardous Materials Transportation Act (HMTA) is the federal legislation that regulates transportation of hazardous materials. The primary regulatory authorities are the USDOT, the Federal Highway Administration, and the Federal Railroad Administration (FRA). The Secretary of the USDOT receives the authority to regulate the transportation of hazardous materials from the HMTA, as amended and codified in 49 U.S.C. 5101 et seq. The PHMSA (formerly the Research and Special Provisions Administration [RSPA]) was delegated the responsibility to write the hazardous materials regulations, which are contained in 49 CFR Parts 100-180. The HMTA requires that carriers report accidental releases of hazardous materials to the USDOT at the earliest practical moment but no later than 12 hours after the occurrence of any incident (49 CFR Subtitle B, Chapter 1, Subchapter C, Part 171.15 Subpart B). Other incidents that must be reported include deaths, injuries requiring hospitalization, and property damage exceeding $50,000.

Under the HMTA, the USDOT regulates the transportation and handling of "reportable quantities" of hazardous substances. These regulations focus on the transportation of hazardous materials by:

- Carriers by rail, aircraft, and vessel
- Interstate and foreign carriers by motor vehicle
- Intrastate carriers by motor vehicle so far as the regulations relate to hazardous wastes, hazardous substances, and flammable cryogenic liquids in portable tanks and cargo tanks.

The transportation of hazardous materials within the state of California is subject to various federal, state, and local regulations. It is illegal to transport explosives or inhalation hazards on any public

highway not designated for that purpose, unless the use of the highway is required to permit delivery or the loading of such materials (California Vehicle Code §§ 31602[b], 32104[a]).

The CHP designates through routes to be used for the transportation of hazardous materials. Transportation of hazardous materials is restricted to these routes except in cases where additional travel is required from that route to deliver or receive hazardous materials to and from users. Information on CHP requirements and regulatory authority is provided in Section 4.9.3, *Regulatory Setting*, below.

Resource Conservation and Recovery Act (40 CFR §240-299)

The Resource Conservation and Recovery Act (RCRA) grants authority to the U.S. Environmental Protection Agency (EPA) to control hazardous waste from start to finish. This covers the production, transportation, treatment, storage, and disposal of hazardous waste. The RCRA also sets forth a framework for the management of non-hazardous solid waste. RCRA allows individual states to develop their own programs for the regulation of hazardous waste as long as they are at least as stringent as the RCRA. The State has developed the California Hazardous Waste Control Law (Health and Safety Code [HSC] sec. 25100 et. Seq. And 22 CCR sec. 66260.1 et seq.) and the EPA has delegated authority for RCRA enforcement to the State. Primary authority for the Statewide administration and enforcement of HWCL rests with California Environmental Protection Agency's (CalEPA) DTSC. RCRA was amended in 1984 by the Hazardous and Solid Waste Act, which affirmed and extended the "cradle to grave" system of regulating hazardous wastes. The 1986 amendments to the RCRA enabled the EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Associated Hazardous and Solid Waste Amendments (40 CFR 260)

Under RCRA, individual states may implement their own hazardous waste programs instead of RCRA, as long as the state program is at least as stringent as the federal RCRA requirements. California's DTSC administers and enforces the federal hazardous waste regulations, in addition to more stringent state hazardous waste regulations. In the state chapter in this section is the Hazardous Waste Control Act of 1972. This Act is the California Waste Management program, which is similar to, but more stringent than RCRA program requires.

RCRA was amended by the Associated Hazardous and Solid Waste Amendments (HSWA), which affirmed and extended the concept of regulating hazardous wastes from generation through disposal. HSWA specifically prohibits the use of certain techniques for the disposal of some hazardous wastes. 40 CFR, Part 260.1 and Part 260.2 provide the guidelines to establish a Hazardous Waste Management System. Part 260.1 defines the terminology, requirements and guidelines necessary to track hazardous waste activities, treatment, storage, and disposal, facility and keep certain records plus submit reports to the EPA at regular intervals. Part 260.2 addresses the availability or confidentiality of information available to the public including both written and electronic hazardous waste manifest.

Hazardous Materials Transportation

The Hazardous Materials Transportation Act, 49 CFR 171, Subchapter C

The USDOT, Federal Highway Administration, and the FRA regulate transportation of hazardous materials at the federal level (state requirements are discussed in following sections). The HMTA requires that carriers report accidental releases of hazardous materials to the USDOT at the earliest practical moment. Other incidents that must be reported include deaths, injuries requiring hospitalization, and property damage exceeding $50,000. The USDOT also specifies the types of cars that must be used to ship crude oil and other materials.

The FRA authorizes the Hazardous Materials Division to administer a safety program, under the Federal Hazardous Materials transportation law (49 U.S.C. § 5101 *et seq*.), that oversees the movement of hazardous materials (including dangerous goods), such as petroleum, chemical, and nuclear products, throughout the Nation's rail transportation system. The FRA's hazardous materials inspection program is primarily responsible for monitoring compliance pursuant to the hazardous materials regulations found in 49 CFR Parts 171–180, including in particular, 49 CFR Part 174, Carriage By Rail. Part 174 include restrictions on the types of hazardous materials that may be shipped, tank car specifications, requirements for labeling, handling, loading, unloading and storage, and requirements for safety and security inspections. In addition, specific handling and tank car requirements are prescribed for explosives, gases, flammable liquids, and poisonous and radioactive materials. FRA inspectors are authorized to inspect railroad or other facilities and all pertinent documents related to hazardous materials transportation to verify compliance with the hazardous materials regulation. Additionally, the FRA has an obligation to investigate possible violations at points where shipments originate and monitor compliance on a regular basis (FRA 2011).

Worker Health and Safety

Occupational Safety and Health Act (29 U.S.C. 651-678)

Under the authority of the Occupational Safety and Health Act of 1970, OSHA, a division of the Department of Labor, established health and safety standards for the workplace, including the accidents and occupational injuries reporting requirements. Relevant regulations include those related to hazardous materials handling, employee protection requirements, first aid, and fire protection, as well as material handling and storage. Relevant portions are summarized below.

Hazard Communication (29 CFR 1910.1200)

The purpose of this section is to ensure that the hazards of all chemicals produced or imported are classified, and that information concerning the classified hazards is transmitted to employers and employees. The requirements of this section are intended to be consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals, Revision 3. The transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, safety data sheets and employee training.

Process Safety Management of Highly Hazardous Materials, 29 CFR 1910.119

This regulation establishes requirements for preventing or minimizing the consequences of catastrophic releases of toxic, flammable, reactive or explosive materials. The Process Safety Management regulation requires compiling process safety information, conducting process hazard analyses, written operating procedures, employee training and participation programs, pre-startup safety reviews, evaluation of mechanical integrity of critical equipment, contractor requirements, written procedures for managing change, hot work permit systems, incident investigations, emergency action plans, and compliance audits.

Airports

Federal Aviation Administration

The Federal Aviation Administration (FAA) regulates aviation at regional, public, private, and military airports. The FAA regulates objects affecting navigable airspace and structures taller than 200 feet according to Federal Aviation Regulation 14 CFR Part 77. The U.S. and California Departments of Transportation also require the proponent to submit FAA Form 7460-1, Notice of Proposed Construction or Alteration. According to 14 CFR Part 77.5, notification allows the FAA to identify potential aeronautical hazards in advance, thus preventing or minimizing any adverse impacts on the safe and efficient use of navigable airspace. Any structure that would constitute a hazard to air navigation, as defined in 14 CFR Part 77, requires issuance of a permit from the California Department of Transportation's (Caltrans's) Aeronautics Program. The permit is not required if the FAA aeronautical study determines that the structure has no impact on air navigation.

State

Federal statutes establish national standards for the transportation, emission, discharge, and the disposal of harmful substances; however, implementation and enforcement of many of the large programs has been delegated to the states by the EPA. In general, states set stricter standards than those required by federal law. Some of the programs delegated to the states are the emissions standards, the water quality standards and the NPDES Programs under the CWA, the hazardous waste program under RCRA, and the drinking water and UIC programs under the SDWA (Brown n.d.). In addition, state laws address gas and liquid pipelines, oil and gas facilities and hazardous materials and waste. Each of these is discussed below.

Hazardous Materials and Hazardous Waste

Whether a material is deemed a hazardous material and/or a hazardous waste determines which state regulation will apply to it. According to HSC § 25124, materials become waste when the material is disposed of, burned or incinerated, or accumulated, stored or treated before or in lieu of being disposed of, burned or incinerated. Recyclable materials that are managed as provided in HSC § 25143.2 and 25143.9 are excluded from classification as waste. A hazardous waste is a

waste that because of its quantity, concentration, or physical, chemical, or infectious characteristics may either:

- Cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness.
- Pose a substantial present or potential hazard to human health or the environment, due to factors including, but not limited to, carcinogenicity, acute toxicity, chronic toxicity, bioaccumulative properties, or persistence in the environment, when improperly treated, stored, transported, disposed of, or otherwise managed (HSC § 25117; 25141).

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Material Release Response Plans and Inventory Act (HSC, Division 20, Chapter 6.95, Sections 25500-25547.8) also known as the Business Plan Act (HSC, Division 20, Chapter 6.95, Sections 25500-25519) requires businesses using hazardous materials to prepare a plan that describes their facilities, inventories, emergency response plans, and training programs. Hazardous materials are defined as raw or unused materials that are hazardous and are part of a process or manufacturing step. Specifically, the California HSC Sections 25503 and 25505 require facilities that store hazardous materials in excess of 55 gallons, 500 pounds, or 200 cubic feet to submit Hazardous Materials Business Plans (HMBPs) to the Certified Unified Program Agency (CUPA). This plan must include a hazardous materials inventory and address emergency response, planning, training, and evacuation.

Uniform Fire Code--Hazardous Materials Management Plan, Hazardous Materials Inventory Statement

The Uniform Fire Code (UFC) prescribes regulations that are consistent with best practices to address fire and explosion hazards that can arise from the storage, handling and use of hazardous substances, materials and devices. The State Fire Marshal has adopted the UFC, with amendments, as the California Fire Code. Local fire departments are required to adopt local fire codes that are no less stringent than the California Fire Code (Brown n.d.).

According to Section 8001.3.1, a permit is required to store, use, or handle hazardous material in excess of specified quantities. A local fire chief may require permit applicants to prepare a Hazardous Materials Management Plan (HMMP) (Section 8001.3.2a) and Hazardous Materials Inventory Statement (HMIS) (Section 8001.3.3a). These documents are consistent with the HMBP (Brown n.d.).

Hazardous Materials Transportation in California

California regulates the transportation of hazardous waste originating or passing through the state in Title 13 of the CCR. The CHP and Caltrans have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies. Caltrans sets standards for trucks in California. The regulations are enforced by the CHP. Common carriers are licensed by the CHP, pursuant to the California Vehicle Code, §32000.5. This section requires

licensing of every motor (common) carrier who transports in excess of 500 pounds of hazardous materials at one time or hazardous materials shipments that require placards.

Under the RCRA, the EPA sets standards for transporters of hazardous waste. In addition, California regulates the transportation of hazardous waste originating or passing through the state; state regulations are contained in the CCR, Title 13. Hazardous waste must be regularly removed from generating sites by licensed hazardous waste transporters. Transported materials must be accompanied by hazardous waste manifests and spills or discharges must be reported.

Hazardous Waste Control Act of 1972 (HSC Division 20, Chapter 6.5)

The Hazardous Waste Control Act established the state hazardous waste management program, which is similar to, but more stringent than RCRA program requirements. The Hazardous Waste Control Law regulates the management of hazardous waste under HSC, Division 20 Chapter 6.5. This law defines hazardous wastes and the procedures for the handling, transportation, and disposal of hazardous waste. The implementing regulations prescribe management practices for hazardous wastes; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. Hazardous waste is tracked from the point of generation to the point of disposal or treatment using hazardous waste manifests. The manifests list a description of the waste, its intended destination, and regulatory information about the waste. The hazardous waste control program is administered by the state DTSC and by local CUPAs.

Title 22 of the CCR Division 4.5, Environmental Health Standards for Management of Hazardous Waste provides the regulatory requirements for the implementation of the law. Chapter 11 defines a waste as hazardous if it has any of the following characteristics: ignitability, corrosivity, reactivity, and toxicity. Article 3 provides detailed definitions of each characteristic. Articles 4 and 5 provide lists of RCRA hazardous wastes, non-RCRA hazardous wastes, hazardous wastes from specific sources, extremely hazardous wastes, hazardous wastes of concern, and special wastes. Chapters 12, 13, and 14 provide the standards for hazardous waste generators and transporters as well as for the owners of transfer, treatment, storage, and disposal facilities.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)

Senate Bill 1082 of 1993 (HSC Chapter 6.11) required the Secretary of the CalEPA to establish a "unified hazardous waste and hazardous materials management" regulatory program (Unified Program) by January 1, 1996. Currently, there are 83 CUPA in California. All counties have been certified by the Secretary. The *Unified Program* consolidates, coordinates, and makes consistent six existing programs.

The Unified Program provides for local implementation of the following six state and federal regulatory programs:

- The Aboveground Storage Tank program (and its Spill, Prevention, Control, and Countermeasures [SPCCs])
- The Hazardous Materials Release Response Plan and Inventory Program (HMRRP) (Business Plan)
- The California Accidental Release Prevention Program (CalARP)
- The California UFC, HMMP, and HMIS
- The Underground Storage Tank program (UST)
- The Hazardous Waste Generator and Onsite Hazardous Waste Treatment program (tiered permitting)

The local implementing agencies are known as CUPAs (certified unified program agencies) or PAs (participating agencies) (Brown, n.d.).

Hazardous Waste and Substances Sites (Cortese) List (California Government Code §65962.5)

This state code requires the state to compile a hazardous waste and substance list. The Cortese List is a planning document used to comply with the CEQA requirements by providing information about the location of hazardous materials release sites. The CalEPA must update the Cortese List annually.

California Accidental Release Prevention (CCR 2745.1, 1997)

CalARP is designed to minimize the risk of extremely hazardous substances that potentially cause immediate harm to the public and the environment by requiring business owner/operator handling one or more regulated substance over the state and/or federal threshold to evaluate and determine the potential impacts of an accidental release. The CalARP mirrors the federal Risk Management Program (RMP) under the federal Clean Air Act Section 112(r), except that it includes external events and seismic analysis to the requirements and includes facilities with lower inventories of materials.

Facilities subject to the CalARP requirements must submit an RMP to the CUPA. The RMP must contain required elements, similar to those required under the federal RMP program, the specific requirements of which are determined by the CalARP "program level" that applies to the facility. For example, the RMP typically must include safety information, process hazard analysis, or hazard review, written operating procedures, training, maintenance, compliance audits, and incident investigations.

Emergency Services Act of 2009

Under the Emergency Services Act, the state developed an emergency response plan to coordinate emergency services provided by federal, state, and local agencies. Rapid response to incidents involving hazardous materials or hazardous waste is an important segment of the plan administered by the California Office of Emergency Services (CalOES), formerly the California Emergency Management Agency. CalOES is responsible for the coordination of overall state agency response to major disasters in support of local government. The office is responsible for assuring the state's readiness to respond to and recover from all hazards – natural, manmade, war-caused emergencies and disasters – and for assisting local governments in their emergency preparedness, response, recovery, and hazard mitigation efforts.

The CalOES Hazardous Materials Section coordinates statewide implementation of hazardous materials accident prevention and emergency response programs for all types of hazardous materials incidents and threats.

Releases of oil that in any way causes harm or threatens to cause harm to public health and safety, the environment, or property, require immediate notification and must be made to the CalOES Warning Center. In addition, any discharge or threatened discharge of oil into state waters must be reported to CalOES. No notification is needed if the release of oil is on land and is not discharged or threatening to discharge into state waters; and (a) does not cause harm or threaten to cause harm to the public health and safety, the environment, or property; and (b) is under 42 gallons.

Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65; HSC Sections 25249.5 et seq.)

The Act requires businesses to notify Californians about significant amounts of chemicals that are released into the environment. It also requires the development of health-protective exposure standards for different media (air, water, land) to recommend to regulatory agencies.

CalEPA Office of Environmental Health Hazard Assessment (OEHHA) is responsible for implementing this Act. The OEHHA evaluates currently available scientific information on substances considered for placement on the Proposition 65 list. Proposition 65 is enforced by the attorney general, district attorneys, and the private citizens acting in the public interest.

California Environmental Protection Agency

The CalEPA was created in 1991, which unified California's environmental authority in a single cabinet-level agency and brought the CARB, SWRCB, RWQCBs, California Department of Resources Recycling and Recovery - formerly the Integrated Waste Management Board, DTSC, OEHHA, and Department of Pesticide Regulation under one agency. These agencies were placed within the CalEPA "umbrella" for the protection of human health and the environment and to ensure the coordinated deployment of state resources. Their mission is to restore, protect, and enhance the environment, to ensure public health, environmental quality, and economic vitality.

Department of Toxic Substances Control

The Department of Toxic Substances Control (DTSC) is a department of CalEPA and is the primary agency in California that regulates hazardous waste, cleans-up existing contamination, and looks for ways to reduce the hazardous waste produced in California. The DTSC regulates hazardous waste in California primarily under the authority of the federal RCRA and the California HSC (primarily Division 20, Chapters 6.5 through 10.6, and Title 22, Division 4.5). Other laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning.

Government Code §65962.5 (commonly referred to as the Cortese List) includes DTSC-listed hazardous waste facilities and sites, DHS lists of contaminated drinking water wells, sites listed by the SWRCB as having UST leaks and which have had a discharge of hazardous wastes or materials into the water or groundwater and lists from local regulatory agencies of sites that have had a known migration of hazardous waste/material.

California Office of Emergency Services

In order to protect the public health and safety and the environment, the California Office of Emergency Services (CalOES) is responsible for establishing and managing statewide standards for business and area plans relating to the handling and release or threatened release of hazardous materials. Basic information on hazardous materials handled, used, stored, or disposed of (including location, type, quantity, and the health risks) needs to be available to firefighters, public safety officers, and regulatory agencies. The information needs to be included in business plans in order to prevent or mitigate the damage to the health and safety of persons and the environment from the release or threatened release of these materials into the workplace and environment. These regulations are covered under Chapter 6.95 of the California HSC Article 1–Hazardous Materials Release Response and Inventory Program (Sections 25500 to 25520) and Article 2– Hazardous Materials Management (Sections 25531 to 25543.3).

CCR Title 19, Public Safety, Division 2, Office of Emergency Services, Chapter 4–Hazardous Material Release Reporting, Inventory, and Response Plans, Article 4 (Minimum Standards for Business Plans) establishes minimum statewide standards for HMBPs. These plans include the following: (1) a hazardous material inventory in accordance with Sections 2729.2 to 2729.7; (2) emergency response plans and procedures in accordance with Section 2731; and (3) training program information in accordance with Section 2732. Business plans contain basic information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed of in the state. Each business shall prepare a HMBP if that business uses, handles, or stores a hazardous material or an extremely hazardous material in quantities greater than or equal to the following:

- 500 pounds of a solid substance;
- 55 gallons of a liquid;
- 200 cubic feet of compressed gas;

- A hazardous compressed gas in any amount; or
- Hazardous waste in any quantity.

California Highway Patrol

A valid Hazardous Materials Transportation License, issued by the CHP, is required by the laws and regulations of State of California Vehicle Code Section 3200.5 for transportation of either:

- Hazardous materials shipments for which the display of placards is required by state regulations; or
- Hazardous materials shipments of more than 500 pounds, which would require placards if shipping greater amounts in the same manner.

Additional requirements on the transportation of explosives, inhalation hazards, and radioactive materials are enforced by the CHP under the authority of the State Vehicle Code. Transportation of explosives generally requires consistency with additional rules and regulations for routing, safe stopping distances, and inspection stops (Title 14, CCR, Chapter 6, Article 1, Sections 1150-1152.10). Inhalation hazards face similar, more restrictive rules and regulations (Title 13, CCR, Chapter 6, Article 2.5, Sections 1157-1157.8). Radioactive materials are restricted to specific safe routes for transportation of such materials.

Low Carbon Fuel Standard Protocol Section C.2.2.(f)

The CARB Carbon Capture and Sequestration Protocol Under the LCFS program (title 17, CCR, section 95480 et seq.) was established through California's AB 32 Global Warming Solutions Act of 2006. CARB designed the LCFS program by setting CI standards that increase in stringency over time for transportation fuels such as gasoline, diesel, and their substitutes used in California. A CCS Project Operator must apply for Sequestration Site Certification pursuant to subsection C.1.1.2(b) and CCS Project Certification following subsection C.1.1.2(d), which are collectively called Permanence Certification, which is required for Geologic Carbon Sequestration Projects. Application for Sequestration Site Certification requires a Site-Based Risk Assessment pursuant to subsection C.2.2, including a Risk Management Plan following subsection C.2.2(c).

CCS Protocol applies to CCS projects that capture CO_2 and sequester it onshore, in either saline or depleted oil and gas reservoirs, or oil and gas reservoirs used for CO_2-enhanced oil recovery (CO_2-EOR). The CCS Protocol applies to both new and existing CCS projects.

California Office of the State Fire Marshal

All proposed pipelines carrying hazardous material is under jurisdiction of the Office of the State Fire Marshal (OSFM). OSFM has delegation of authority from the PHMSA over intrastate pipelines. The OSFM requires oversight and approval of design, operations plan, operations safety plan, construction plans, hydrologic testing per USDOT code 49 CFR Government Code Section 195 regulating hazardous liquids pipelines design, construction, and operation. OSFM would also review the CEQA document for spill of materials analysis and hazard impact analysis and would require monitoring of construction of pipelines, transfer stations, and injection wells.

Note that under Part 195 - Transportation of Hazardous Liquids by Pipeline, specifically, 195.6 Unusually Sensitive Areas, the project may fall under one of these qualifying definitions.

Regulatory Programs that Have Both a Federal and State Nexus Relevant to this Project

This section synthesizes information provided above for two topic areas that have multiple state and federal requirements, hazardous material releases and reporting, and discharges to underground injection wells.

Hazardous Materials Releases and Reporting

In California, emergency release reporting and response requirements extend across several federal statutes and numerous state laws:

- CERCLA (U.S.)
- Emergency Planning and Community Right-to-Know Act (U.S.)
- CWA (U.S.)
- RCRA (U.S.)
- The Waters Bill (House Resolution 6204)
- The Hazardous Waste Control Law (California)
- The Porter-Cologne Water Quality Protection Act (California)
- The Aboveground Petroleum Storage (California)
- The UST laws (California)
- The Occupational Carcinogens Control Act (California)

These laws differ as to what releases must be reported (e.g., releases to "the environment" vs. releases to "waters of the state"), and which materials or chemicals that are subject to regulations. The Waters Bill represents the minimum reporting burden for state-only releases because of the broadness of the "hazardous materials" and "release" definitions. Regulations implementing hazardous materials inventories and release reporting provisions have been adopted by the Office of Emergency Services (19 CCR §2620-2734). Kern County primarily administers these provisions.

CalARP's goal is to prevent accidental releases of substances that pose the greatest risk of immediate harm to the public and the environment. Kern County conducts inspections at CalARP facilities and reviews RMPs. Cogeneration anhydrous ammonia plants are an example of this facility type in an oilfield.

Hazardous materials handlers must report significant releases. Handlers must orally report as soon as possible without impeding control of the release and a written follow-up report must be made to the local agency and to the Office of Emergency Services.

In reporting hazardous materials releases, facilities must report, at a minimum: (1) the location of the release; (2) the hazardous materials are involved; (3) the quantity of material involved; (4) the potential hazards; (5) when the release occurred; and (6) the responsible party.

California regulates underground storage tanks through the California HSC. Should an unauthorized release occur, the regulations require release reporting, investigation and abatement by the Owner. The release must be reported to the local administering agency, Kern County and to DTSC or the California RWQCB within 24 hours of discovery. A full written report is required by the owner within five days.

Additionally, the EPA maintains the Emergency Response Notification System database. This database is updated weekly and provides a record of all phone calls made to the NRC. The NRC is notified regarding any number of different types of spills or releases.

Discharges to Injection Wells

State and federal authorities regulate the subsurface injection of waste. The Porter-Cologne Act (see Section 4.10, *Hydrology and Water Quality*,) regulates subsurface injection discharges that could affect the quality of "waters of the state" and requires dischargers to file a Report of Waste Discharge with the local Regional Board and comply with issued WDRs.

The federal SDWA regulates underground injection to protect usable drinking water supplies from contamination. States can apply to the EPA to regulate this program within their own boundaries. For wells associated with oil and gas production (referred to as "Class II" wells), California has a EPA-approved UIC program. CalGEM administers the Class II UIC program pursuant to a "Primacy Agreement and Memorandum of Understanding" with the EPA that was established in 1983. For classes of wells other than Class II, California does not have an EPA-approved UIC program and EPA Region IX administers the UIC program directly.

California Pipeline Safety Act of 1981 (Cal. Gov. Code § 51010)

This California Pipeline Safety Act gives regulatory jurisdiction to the state Fire Marshal for the safety of all intrastate hazardous liquid pipelines and oil interstate pipelines used for the transportation of hazardous or highly volatile liquid substances. The law establishes the federal Hazardous Liquid Pipeline Safety Act (49 U.S.C. Section 2001 et seq.) and federal pipeline safety regulations as the governing rules for intrastate pipelines. This statute also authorizes the state Fire Marshal by agreement with the United States Secretary of Transportation, to implement the federal Hazardous Liquid Pipeline Safety Act and federal pipeline safety regulations as to those portions of interstate pipelines located within the state. It also establishes the civil penalties for violations of the act or its regulations.

Health and Safety

California Occupational Safety and Health Administration

California Occupational Safety and Health Administration (Cal/OSHA) is the primary agency responsible for worker safety in the handling and use of chemicals in the workplace. Cal/OSHA standards are generally more stringent than federal regulations. The employer is required to monitor worker exposure to listed hazardous substances and notify workers of exposure (8 CCR Sections 337-340). The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substance exposure warnings.

California Occupational Safety and Health Act of 1973 –Labor Code Section 6300-6332

Cal/OSHA is responsible for developing and enforcing the workplace safety regulations in Title 8 CCR. This includes ensuring worker safety in the handling and use of chemicals in the workplace. Cal/OSHA hazardous materials regulations include requirements for safety training, availability of safety equipment, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA requires businesses to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans.

Cal/OSHA also enforces hazard communication program regulations, which contain training and information requirements, including procedures for identifying and labeling hazardous substances. The hazard communication program also requires that Material Safety Data Sheets be available to employees and that employee information and training programs be documented. Workers must be informed of the hazards associated with the materials they handle and manufacturers are required to label containers and provide worker training.

Local

Kern County General Plan

The project area is located within the Kern County General Plan (KCGP) area and, therefore, would be subject to applicable policies and measures of the KCGP. The Land Use, Conservation, and Open Space Element, Circulation Element, Safety Element, and Energy Element of the KCGP includes goals, policies, and implementation measures related to hazards and hazardous materials that apply to the project, as described below.

Chapter 1. Land Use, Conservation, and Open Space Element.

1.3 Physical and Environmental Constraints

Goals

Goal 1. To strive to prevent loss of life, reduce personal injuries and property damage, and minimize economic and social diseconomies resulting from natural disaster by directing development to areas that are not hazardous.

Policies

Policy 1. Kern County will ensure that new developments will not be sited on land that is physically or environmentally constrained (Map Code 2.1 [Seismic Hazard], Map Code 2.2 [Landslide], Map Code 2.3 [Shallow Groundwater], Map Code 2.5 [Flood Hazard], Map Codes 2.6–2.9 and Map Code 2.10 [Nearby Waste Facility], and Map Code 2.11 [Burn Dump Hazard]) to support such development unless appropriate studies establish that such development will not result in an unmitigated significant impact.

Policy 3. Zoning and other land use controls will be used to regulate, and prohibit, if necessary, future development when physical hazards exist.

1.4 Public Facilities and Services

Goals

Goal 9. Serve the needs of industries and Kern County residents in a manner that does not degrade the water supply and the environment and protect the public health and safety by avoiding surface and subsurface nuisances resulting from the disposal of hazardous wastes, irrespective of the geographic origin of the waste.

Implementation Measures

Implementation Measure N. Secure complete and accurate information on all hazardous wastes generated, handled, stored, treated, transported, and disposed of within or through Kern County.

Implementation Measure O. Reduce to the greatest degree possible the amount of waste to be disposed of by encouraging private industry to construct and manage a high quality system of transfer stations, recycling facilities, treatment plants, and incinerators located near the generators of hazardous waste.

Implementation Measure R. Roads and highways utilized for commercial shipping of hazardous waste destined for disposal will be designated as such pursuant to Vehicle Code Sections 31303 et seq. Permit applications shall identify commercial shipping routes they propose to utilize for particular waste streams.

Chapter 2. Circulation Element

2.5.4. Transportation of Hazardous Materials

Goals

Goal 1. Reduce risk to public health from transportation of hazardous materials.

Policies

Policy 1. The commercial transportation of hazardous material, identification and designation of appropriate shipping routes will be in conformance with the adopted Kern County and Incorporated Cities Hazardous Waste Management Plan.

Policy 2. Kern County and affected cities should reduce use of County-maintained roads and city-maintained streets for transportation of hazardous materials.

Chapter 4. Safety Element

4.2. General Provisions

Goals

Goal 4. The County shall encourage extra precautions be taken for the design of significant lifeline installations, such as highways, utilities, and petrochemical pipelines.

4.6. Wildland and Urban Fire

Hazard Identification

Access and Evacuation Routes - Good planning principles, as well as existing policies and laws, dictate that all developments must be planned with circulation routes that will assure safe access for fire and other emergency equipment. The circulation routes must include secondary means of ingress and egress, consistent with topography, to meet emergency needs.

The general circulation routes are provided throughout the County by federal, state, and County-maintained road systems which are adequate for access and evacuation. State and County laws regulate the standards for new public circulation routes.

Private circulation routes that are not maintained by the state or County are subject to the standards set forth in Kern County Ordinance No. G-1832.

Clearance of Vegetative Cover for Fire Control - In 1963 the State of California enacted the Public Resources Code clearance law. This is a minimum statewide clearance law of flammable vegetative growth around structures, especially in brush- and tree-covered watershed areas. The enactment of a local ordinance is necessary where more restrictive fire safety clearance measures are desirable to meet local conditions.

Fuel Breaks and Firebreaks - Fuel breaks and/or firebreaks separating communities or clusters of structures from the native vegetation may be required. Such fuel breaks may be "greenbelts," as all vegetation need not be removed but thinned or landscaped to reduce the volume of fuel.

All fuel and firebreaks are required to meet the minimum design standards of the Kern County Fire Chief.

The Fire Department's Chief may require a fire plan for a development during the critical fire season. This plan should reflect the proposed course of action for fire prevention and suppression.

The parcel size and setback distances of buildings placed thereon should be such that adequate clearance of flammable vegetation cover may be performed within the limits of the owner's parcel of land.

Should the owner of a property fail to apply the required firebreak clearance, following proper notice, the County may elect to clear the firebreak vegetation and make the expense of the clearing a lien against the property upon which the work was accomplished.

Hazardous Fire Area - The Hazardous Fire Areas consists mainly of wildlands, which are mountain and hill land in an uncultivated, more or less natural state, covered with timber, wood, brush, and grasslands. This area includes some urban influence and agricultural use, such as exists around Isabella Lake and the Kern River, Woody/Glennville, Tehachapi/Cummings Valley, and Lebec/Frazier Park/Lake of the Woods.

The wildlands provide prime habitats for deer, mountain lions, bears, kit foxes, quail, chucker, wild turkeys, and condors. They also harbor fifteen identified and important rare botanic communities and vegetation associations.

The Kern County Hazardous Fire Area was established by an amendment to the Uniform Fire Code, Section 1.49H under Section 4016 of the Kern County Ordinance Code.

The boundaries of the Hazardous Fire Area are determined and publicly announced before the start of each annual "fire season" and is normally the period from April 15 to December 1 of each year, except when the Fire Chief extends this period.

The wildlands include valuable watersheds that must be preserved for receiving and passing water into surface streams and underground storage. Protection of the watersheds will prevent erosion and flood damages.

For the protection of our wildlands we must consider all factors which will aid in fulfilling the policy stated in the California Environmental Quality Act, Public Resources Code Section 21000 et seq., to "create and maintain conditions under which man and nature can exist in productive harmony to fulfill the social and economic requirements of present and future generations."

In implementing their Fire Prevention Program, Fire Department personnel periodically inspect the areas around all buildings for accumulations of flammable material and closure of openings of vacant buildings.

Policies

Policy 1. Require discretionary projects to assess impacts on emergency services and facilities.

Policy 2. The County will encourage the promotion of public education about fire safety at home and in the work place.

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 6. All discretionary projects shall comply with the adopted Fire Code and the requirements of the Fire Department.

Implementation Measures

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.

4.9. Hazardous Materials

Policies

Policy 2. Innovative technologies to manage hazardous waste streams generated in Kern County will be encouraged.

Implementation Measures

Implementation Measure A. Facilities used to manufacture, store, and use of hazardous materials shall comply with the Uniform Fire Code, with requirements for siting or design to prevent on-site hazards from affecting surrounding communities in the event of inundation.

Kern County Certified Unified Program Agency

The CUPA was developed to consolidate the administration of hazardous materials programs. In the Kern County, the CUPA is the Environmental Health Services Division. The city of Bakersfield's CUPA is the Bakersfield Fire Department. Under CUPA, site inspections of aboveground storage tanks, underground storage tanks, hazardous waste treatment, hazardous waste generators, hazardous materials management and response plans, and the California Fire Code are consolidated in a single inspection. These departments also provide emergency response to hazardous materials events.

Kern County Fire Code

Kern County has adopted, by reference, portions of the California Building Standards Code and the UFC, with modifications and amendments, in Chapter 17.32 of the Kern County Code of Building Regulations (Fire Code). The purpose of this code is to prescribe the minimum requirements necessary to establish a reasonable level of fire safety to protect life and property from hazards created by fire, explosion, and dangerous conditions.

The Kern County Fire Code defines a hazardous fire area as any land that is covered with grass, grain, brush, or forest and situated (e.g., in an inaccessible location) so that a fire originating upon such land would present an abnormally difficult job of suppression and would result in great and unusual damage through fire or the resulting erosion.

Kern County Multi-Hazard Mitigation Plan

The purpose of the multi-hazard mitigation plan is to reduce or eliminate the long-term risk to people and property from natural hazards and their effects in the County. The 2019-20 Update to the Plan is to help Kern County become less vulnerable to losses from future disasters. The multi-jurisdictional plan includes the County and the incorporated municipalities of Arvin, Bakersfield, California City, Delano, Maricopa, Ridgecrest, Shafter, Taft, Tehachapi, and Wasco. The County also encompasses areas of land controlled by federal and State land management agencies, including the California Department of Forestry and Fire Protection, Bureau of Land Management, and Bureau of Reclamation. While other levels of government have jurisdiction in these parts of the County, the Hazard Mitigation Plan could also be used to document and coordinate mitigation efforts among federal, State, and local jurisdictions. This plan also covers 49 special districts that include school, airport, community service, water, recreation and park, sanitation, and other districts.

Kern County and Incorporated Cities Hazardous Waste Management Plan

State Assembly Bill 2948 (1986) authorized local governments to develop comprehensive hazardous waste management plans. The intent of each plan is to ensure that adequate treatment and disposal capacity is available to manage the hazardous wastes generated within the local government's jurisdiction. The Kern County and Incorporated Cities Hazardous Waste Management Plan (Hazardous Waste Plan) was first adopted by Kern County and each incorporated city before September 1988 and was subsequently approved by the California Department of Health Services. The Hazardous Waste Plan was updated and incorporated by reference into the KCGP in 2004 as permitted by HSC Section 25135.7(b), and thus must be consistent with all other aspects of the KCGP.

The Hazardous Waste Plan 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 Hazardous Waste Plan 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 hazardous Waste Plan is to coordinate local implementation of a regional action to effect comprehensive hazardous waste management throughout Kern County. The action

program 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 small quantity hazardous waste generators. An important component of the Hazardous Waste Plan is the monitoring of hazardous waste management facilities to ensure compliance with federal and state hazardous waste regulations. The siting criteria and any subsequent environmental documentation required pursuant to the CEQA would also ensure the mitigation of adverse impacts associated with the siting of any new hazardous waste facility.

Kern County Airport Land Use Compatibility Plan

The purpose of the Kern County ALUCP is to establish procedures and criteria by which the County of Kern and the affected incorporated cities can address compatibility issues when making planning decisions regarding airports and military operations areas and the land uses around them. In general, the plan describes and maps influence areas in the vicinity of public use airports in Kern County where development restrictions are established to prevent the construction or placement of structures or objects which may be an obstruction to air navigation. The plan covers airports in the unincorporated portions of the County and the affected incorporated cities of Bakersfield, California City, Delano, Shafter, Taft, Tehachapi, and Wasco. The plan was last updated in 2012. The project site is located approximately 2 miles from the Elk Hills-Buttonwillow Airport but is not within its ALUCP defined Airport Influence Area.

Kern County Code of Ordinances Chapter 19.76 – Airport Approach Height (H) Combining District

The purpose of the Kern County Airport Height (H) Combining District is to minimize aviation hazards by regulating land uses, restricting the height of buildings and vegetation, and specifying design criteria necessary to promote aviation safety and to implement the requirements of the adopted ALUCP. The H district may be applied to areas within the vicinity of any public or general-use airport as provided for in the ALUCP. The H district design standards restrict the types of lighting, surface reflectivity, types and heights of structures and electrical or radio interference with air navigation communications. The H district design standards also require that storage of more than 2,000 gallons of non-aviation liquid fuel at privately-owned airports in the B-1 and B-2 airport land use compatibility zones be restricted to underground storage tanks. The H district further requires that except for the construction of single-family dwellings and permitted residential accessory structures on existing lots of record, no use, building, structure, plant, or tree shall be established until and application for site development plan review has been submitted to and approved by the Planning Director.

4.9.4 Impacts and Mitigation Measures

Methodology

To evaluate the potential impacts of the project with respect to the thresholds of significance outlined in the following section, each threshold of significance was evaluated at a project level.

The primary issues associated with the project that could impact public health are whether the anticipated activity would increase risks to public safety and the environment. To evaluate these risks, present practices, regulatory requirements, and accidents/spills/releases were considered.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist state that a project would normally be considered to have a significant impact if it would:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 1/4 mile of an existing or proposed school;

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

e) For a project located within the adopted Kern County Airport Land Use Compatibility Plan, would the project result in a safety hazard or excessive noise for people residing or working in the project area;

f) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan;

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires;

h) Would implementation of the project generate vectors (flies, mosquitoes, rodents, etc.) or have a component that includes agricultural waste?

Specifically, would the project exceed the following qualitative threshold:

The presence of domestic flies, mosquitoes, cockroaches, rodents, and/or any other vectors associated with the project is significant when the applicable enforcement agency determines that any of the vectors:

i. Occur as immature stages and adults in numbers considerably in excess of those found in the surrounding environment; and

ii. Are associated with design, layout, and management of project operations; and

iii. Disseminate widely from the property; and

iv. Cause detrimental effects on the public health or well-being of the majority of the surrounding population.

Based on these standards, the effects of the project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a "significant unavoidable impact."

Project Impacts

Impact 4.9-1: Create a Significant Hazard to the Public or the Environment through the Routine Transport, Use, or Disposal of Hazardous Materials

Construction

All Project Components

Project construction would involve the transport, use, and disposal of hazardous materials such as fuels, lubricants, toxic solvents, and herbicides. Construction equipment generally contains limited amounts of hazardous materials such as diesel fuel, hydraulic oil, lubricants, grease, solvents, cleaners, adhesives, paints, and other petroleum-based products.

Construction activities that could be authorized under this Project include, among other activities, well pad preparation; access road construction; drilling; well completion; minor pad preparation for CO_2 capture. compression and pumping stations; as well as well stimulation activities, which are addressed separately.

The potential exists for an accidental release of hazardous materials during routine construction activities. Improper management or maintenance of hazardous materials containers, handling of hazardous materials (transfer between containers and equipment), storage, or disposal could result in leaks or larger releases which result in the contamination of soil or potentially surface water bodies, depending on the location of the release. CO_2 construction activities also have the potential to result in exposure to these hazardous materials by workers, or by the public, if access to the construction site is not adequately controlled or if the materials are not properly handled and contained.

Vehicles and equipment used for construction would contain or require the short-term use of small amounts of potentially hazardous materials including, but not limited to, fuels, lubricating oils, solvents, antifreeze, hydraulic fluid, and compressed gasses. Portable generators often are used so diesel tanks could be used. Other construction activities would likely use gasoline, diesel fuel, and lubricants for fueling vehicles and paints, adhesives, and solvents for the construction of the facilities buildings. Other specialized chemicals that are potentially hazardous substances could also be used depending on the type of construction activity. These could include compressed gases; fuels, oils, and lubricants; acids; bases; demulsifiers; bactericides; and solvents. These and other products may be stored at the well pad to support the drilling process.

In general, large quantities of hazardous materials are not stored on construction sites. Materials that are used regularly are re-supplied by oilfield servicing companies. At any construction site to comply with federal and state regulations, hazardous materials should be stored in their original containers in a designated area that is protected from the weather and that is lined and bermed to contain any leaks or spills and prevent a release to soil or waters. The Occupational Safety and Health Standards 1910 Subpart H Hazardous Materials provides guidelines by which hazardous materials should be handled and stored in the workplace. Specific requirements are provided for many different chemicals. In addition, the California Fire Code prescribes regulations that address the storage, handling and use of hazardous substances, materials, and devices within the state. California HSC section 25504(a-c) and 22 CCR part 66265.16 require an owner or operator to complete and submit an HMBP if the facility handles a hazardous material or mixture containing a hazardous material that has a quantity at any one time during the reporting year equal to or greater than 55 gallons of liquid; 500 pounds of a solid; 200 cubic feet at standard temperature and pressure of a compressed gas; any quantity of hazardous waste; and amounts of radioactive materials requiring and emergency plan pursuant to Parts 30, 40, or 70 of Title 10 CCR. Most applicants would have to develop HMBPs, because diesel fuel is regularly stored in bulk at construction sites to fuel generators, hazardous waste is likely to be generated, and radioactive materials are used during drilling. In addition, storage of fuel or other petroleum products during construction in aboveground tanks or other containers with individual volumes greater than 55 gallons and that have a total volume of more than 1,320 gallons would be subject to the SPCC Plan requirements of 40 CFR Part 112, if waters of the United States are present. These regulations are designed, in part, to ensure that hazardous materials and oil and petroleum products are properly managed and contained to minimize the potential for a release to the environment, thereby limiting the potential for related exposure to the environment, workers, and the public.

Project construction would occur in accordance with all applicable local standards set forth by the County, as well as State and federal health and safety requirements that are intended to minimize hazardous materials risk to the public. Implementation of Mitigation Measure (MM) 4.9-1 requires a Worker Environmental Awareness Program to describe proper handling, storage, transport, and disposal techniques and methods to be used to avoid spills and minimize impacts in the event of a spill, and ensure that all handling, storage, and disposal of hazardous materials would be conducted in accordance with proven practices to minimize exposure to maintenance workers and/or the public. In addition, MM 4.9-3 would require implementation of best practices for the avoidance, handling, and clean-up of hazards and hazardous materials based on OSHA safety standards, Cal/OSHA, and the Kern County Fire Department.

Construction of the project would result in the generation of various waste materials that would require recycling and/or disposal, including some waste materials that could be classified as hazardous waste. Implementation of MM 4.9-2 would arrange for transportation, storage, and disposal of all hazardous materials in compliance with the HMTA. Hazardous materials would be transported by a licensed hazardous waste hauler and disposed of at facilities that are permitted to accept such materials, as required by USDOT, RCRA, and State regulations. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release. Compliance with MM 4.9-2 and existing regulations regarding the management, transport, and disposal of hazardous materials, as

discussed under Section 4.9.3, *Regulatory Setting* during construction of the project would be less than significant.

Prior to construction, implementation of MM 4.9-4 would require that for all CO_2 facility pipelines, the operator shall submit for review by the County and State Fire Marshall a construction permit site plan that details full location of the facility pipeline, width of easement for the pipeline, and specifications of pipeline appurtenances. It would also require compliance with USDOT and PHMSA regulations and require notification of any hazardous materials/waste release, other than CO_2, immediately upon discovery, and to applicable agencies. Additionally, implementation of MM 4.9-5 would require the completion of a Phase II ESA and development of a Soil Management Plan to properly manage affected soils/wastes that are encountered during ground disturbing activities. Furthermore, MM 4.9-9 requires written evidence of the issuance of an EPA UIC Program Construction permit and compliance with all applicable conditions and requirements of the CUP and Mitigation Monitoring and Reporting Program.

Implementation of MM 4.9-6 through MM 4.9-8 would be implemented to prevent the release or accidental spillage of hazardous waste and/or materials used during construction. These measures identify the required handling, storage, transport, and disposal techniques and methods to be used to avoid spills and minimize impacts in the event of a spill.

Because the project would result in land disturbance involving more than one acre, the management of soil and hazardous materials during construction activities would be subject to the requirements of the NPDES Construction General Permit (described in detail in Section 4.10, *Hydrology and Water Quality*), which requires preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes hazardous materials storage 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. See Section 4.10, *Hydrology and Water Quality*, of this Draft EIR for more details. In addition, MM 4.9-7 would require measures to prevent the release or accidental spillage of hazardous materials into water bodies or water sources.

Compliance with existing regulations and implementation of MM 4.9-1 through MM 4.9-9 regarding the management, transport, and disposal of hazardous materials, as above and discussed under Section 4.9.3, *Regulatory Setting*, would be mandatory. This would ensure that potential impacts related to the routine transport, use, or disposal of hazardous materials during construction of the project would be less than significant.

Well Stimulation

WST operations are considered a construction activity under this Project but are addressed separately because of the high level of public interest associated with the issue.

Hazardous materials, such as fuel and motor oil used in construction equipment, hydraulic oil and hydraulic fracturing fluid components (cross-linker, scale treatments, breaker, activator, and pH control), acids, biocides, and other well treatment chemicals would be used in downhole

applications during the WST operations. Well stimulation in Kern County is used to complete wells in certain formations. Not all of the wells drilled and completed in Kern County require completion using WST operations as defined by SB 4, however. Well stimulation in California is regulated by CalGEM under SB 4, WST Regulations. While the EPA has not issued any generally applicable federal regulations concerning WST activities.

Under the SB 4 WST regulations, any operator must apply for and obtain a permit to use well stimulation techniques. In the application, the operator must describe:

- The composition of the fluids to be used;
- The chemicals to be used and their concentrations;
- The disposal method of recovered water;
- The anticipated procedures to comply with the Hazardous Waste Control Law; and
- An estimate of the volume of generated waste materials and how they will be disposed of.

Further, all applicants applying to conduct a defined well stimulation operation would be required to store and manage hydraulic fracturing fluids in compliance with all applicable requirements of the RWQCB, the DTSC, CARB, the Air Pollution Control District, the CUPA, and any other state or local agencies with jurisdiction over the location of the well stimulation activities. In addition, the Applicant would be required to adhere to Storage and Handling of WST Fluids and Wastes regulations that require that fluids be stored with secondary containment, with certain exceptions. The Applicant must have a Spill Contingency Plan that accounts for all production facilities outside of secondary containment and include specific steps to be taken and equipment available to address a spill outside of secondary containment. In addition, the Applicant would have to comply with testing, inspection, and maintenance requirements for production facilities containing WST fluids. All fluids must be accounted for in the operator's Spill Contingency Plan, cannot be stored in containers and shall not be stored in sumps or pits. If an unauthorized release occurs, the Applicant must immediately implement its Spill Contingency Plan; notify the appropriate response entities for the location and the type of fluids involved, as required by all applicable federal, state, and local laws and regulations; and perform clean up and remediation of the area, and dispose of any cleanup or remediation waste, as required by all applicable federal, state, and local laws and regulations. In addition, the Applicant would have to report the release within five days.

During well stimulation procedures, applicants would have to continuously monitor and record specific parameters. Operators must terminate stimulation and immediately report to CalGEM if certain critical pressure thresholds are reached or if there is a potential breach of the well casing. If an unauthorized release occurs, the operator must implement its Spill Contingency Plan, notify the appropriate authorities, cleanup or remediate, and report to CalGEM.

Unauthorized releases have occurred and would likely continue to occur during well stimulation activities. The potential effect of the release would depend on its size, its location in the well bore, and the proximity to either aquifers or surface sensitive receptors; therefore, the potential impacts could be significant.

Operation

Operation of the project would involve the routine storage and use of hazardous materials for operations and routine maintenance.

Capture Facilities

The CO_2 capture facilities would utilize a traditional amine absorption process. Amines are classified as hazardous under the criteria of the federal OSHA Hazard Communication Standard 29 CFR 1910.1200. Amines are harmful if swallowed and could cause severe skin burns and eye damage. Capturing CO_2 from existing stationary sources would utilize hazardous chemicals typical of an oil production and power generation facility. These chemicals include diluted amine, concentrated amine, caustic, sulfuric acid, calcium chloride, triethylene glycol, corrosion inhibitors, scale inhibitors, brominated biocide, sodium hypochlorite, and citric acid. Each of these chemicals are classified as hazardous under the criteria of the federal OSHA Hazard Communication Standard 29 CFR 1910.1200. Many of these chemicals are harmful if swallowed and could cause skin and eye damage.

As a result of these operations, the project would generate potentially hazardous waste. The owner/applicant would determine the toxicity and physical properties of the waste streams generated to determine the proper waste classification and disposal methods in compliance with applicable regulations i.e., California HSC and CCR. The owner/applicant would add all waste material to the required California Environmental Reporting System State database along with the required Site Maps and Consolidated Contingency and Emergency Response Plans. The CO_2 capture process would generally generate result in three types of hazardous waste material: degraded amine, carbon filtration media; and amine filter cartridges.

Use and storage of hazardous materials is regulated by applicable federal, State, and local regulations. Compliance with these requirements would serve to minimize health and safety risks to people or structures associated with routine use, transport, and disposal as well as accidental release of or exposure to hazardous materials. Implementation of MM 4.9-1 through MM 4.9-3, MM 4.9-7, and MM 4.9-8 would be implemented to prevent the release or accidental spillage of hazardous waste and/or materials used during operations.

Transport, Injection, and Failure

The project would include five full-time employees, who would operate the facility seven days a week, 24 hours a day. An additional five full-time employees could be on-site at any time if repairs or other maintenance work is required. In general, impacts during normal operations of the project would be limited to personnel directly involved in project operations and maintenance. As detailed in Section 4.3, *Air Quality*, CO_2 is an asphyxiant that could pose health risks to personnel, public, and the environment if leakage were to occur during operations.

The Site Based Risk Assessment (Appendix F) reviewed the project for potential hazards/risks and developed a range of CO_2 leakage scenarios that could result in a significant hazard to the public or the environment. The effect of any CO_2 leakage from a pipeline would depend on its location

and the type and quantity of materials released. Each of the potential hazards/risks for CO_2 leakage was characterized with probability of occurrence and severity of potential consequence. Severity of potential consequences are classified as insubstantial, substantial, or catastrophic. A CO_2 dispersion model for the range of potential occurrences is included in Appendix B-4. The worst-case event for a catastrophic failure results in dispersion for a range of 867 feet even with high winds. The nearest community to the underground pipeline that would be affected by such a failure is Buttonwillow at 4 miles. The nearest school is McKittrick Elementary School at 4.45 miles. The full range of potential CO_2 leakage scenarios are discussed in detail in Appendix B-4 and are summarized below. Potential health risks associated with CO_2 exposure are described in Section 4.3, *Air Quality*.

Injection or Monitoring Well Failure

CO_2 leakage could occur from failure of an injection or monitoring well during operation. CO_2 migration could occur along an injection and/or monitoring well due to poor or subsequently degraded facility pipelines. Integrity loss at the injection and/or monitoring well may endanger shallow groundwater. However, there are no records of water supply wells within the project area. In addition, there is no groundwater used as drinking water and no complete pathway for exposure to contaminated groundwater (see Section 4.10, *Hydrology and Water Quality*). The severity of this potential consequence is classified as insubstantial. Implementation of MM 4.9-10 would require compliance with all requirements of the EPA issued UIC CCS Program permit and EPA, conditions of the approved Conditional Use Permit, and requirements of the adopted Mitigation Measure and Reporting Program. Therefore, impacts would be less than significant.

Equipment Failure

Damage to or failure of pipelines and surface equipment can result in CO_2 leakage. There is a possibility of fugitive emissions from surface equipment in the event of equipment failure. The severity of this potential consequence would be insubstantial. As discussed above, there is no pathway for drinking water contamination (see Section 4.10, *Hydrology and Water Quality*). In addition, minor CO_2 fugitive emissions do not pose an acute risk to human health or the environment. Therefore, impacts would be less than significant.

Natural Disaster

The project is located in the San Joaquin Valley. Climate in the region is characterized as has a hot, dry climate and on average, the valley floor receives approximately eight inches of precipitation per year. Although not common, potential desert natural disasters include lighting strikes, flash-flooding and earthquakes.

Well problems (integrity loss, leakage, or malfunction) may arise as a result of a natural disaster (e.g., earthquake, lightning strike, or flooding) affecting the normal operation of the injection well.

Earthquakes: As discussed in Section 4.7, *Geology and Soils*, there are numerous earthquake faults in the vicinity of the project area. However, implementation of MM 4.7-1 would be required to reduce these potential impacts to a less than significant level. See Section 4.7, *Geology and Soils*,

of this EIR for further discussion of potential impacts from CO_2 leakage from an induced seismic event.

Lightning Strikes: The project site is located in an area that has 0-0.25 flashes/square kilometer/year, the lowest lightning strike density in the United States. In the more than 100-year operating history of the project site, there has not been a single recorded impact on oil operations from lighting.

Flooding: As discussed in Section 4.10, *Hydrology and Water Quality*, the project is located in two FIRM areas (FIRMS 06029C2200E and 06029C2225E). Both FIRM areas are designated as Zone X, which is identified as areas that experience minimal flooding, and are outside of the 0.2 percent annual chance floodplain.

The severity of this potential consequence would be insubstantial to catastrophic depending on nature of disaster. Therefore, impacts would be less than significant.

Fluid Leakage to Shallow Groundwater

CO_2 leakage out of the project site could result in CO_2 leakage into shallow groundwater. However, there are no records of water supply wells within the project site. There is no groundwater used as drinking water and no complete pathway for exposure to contaminated groundwater. The severity of this potential consequence would be insubstantial. As discussed in Section 4.10, *Hydrology and Water Quality*, implementation of MM 4.10-4 and MM 4.10-5, the UIC program would prevent discharge into any underground source of current or future beneficial use groundwater. Injection of CO_2 into the ground via injection well would not mix with or contaminate groundwater. Therefore, impacts would be less than significant.

See Section 4.10, *Hydrology and Water Quality*, of this EIR for further discussion of potential impacts from CO_2 leakage to shallow groundwater.

Induced Seismic Event

There are numerous earthquake faults in the vicinity of the project area. Given the proximity of the project site to overall seismic activity in the region, project structures may be subject to strong ground shaking, which may result in CO_2 leakage. The severity of this potential consequence would be insubstantial. As described in Section 4.7, *Geology and Soils*, impacts from seismic hazards are considered potentially significant without mitigation. Implementation of MM 4.7-1 would be required to reduce these potential impacts to a less than significant level.

See Section 4.7, *Geology and Soils*, of this EIR for further discussion of potential impacts from CO_2 leakage from an induced seismic event.

CO_2 Leakage to Atmosphere

The project could result in health impacts project personnel and the public if CO_2 were to leak into the atmosphere. CRC classified the severity of this potential consequence as insubstantial to catastrophic depending on CO_2 levels in the breathing space. As discussed in Section 4.3, *Air*

Quality, implementation of MM 4.3-5 would require that no injection well shall be located within 4,000 feet of any sensitive receptor. There, impacts would be less than significant.

See Section 4.3, *Air Quality*, of this EIR for further discussion of potential impacts from CO_2 leakage to the atmosphere.

Well Operations (Drilling or Workover)

Drilling a new well into or through a CO_2 injection zone could create potential risk of release of CO_2 from the subsurface resulting in risks to human health and the environment. CRC classified the severity of this potential consequence as insubstantial to catastrophic. Impacts from well operations, such as drilling, are considered potentially significant without mitigation. In the case of emergencies or releases, implementation of MM 4.9-12 requires that information shall be communicated immediately upon discovery to the Kern County Fire Marshall and Public Health with reports to the Kern County Planning and Natural Resources Department within 24 hours after. Therefore, potential impacts would be less than significant level.

CO_2 leakage during operational activities could result in impacts on public and/or the environment because CO_2 could be released into the environment. Therefore, the potential release of subsurface hazardous materials into the environment during operation of the project is a significant impact. However, implementation of MM 4.9-1 and MM 4.9-12 would reduce impacts to less than significant.

Other Operational Activities

Other ancillary operational activities that could be occur with this Project include, waste management; control of vegetation; maintenance and testing of well, pipeline, tank and vessels; and maintenance of access roads.

In Kern County, the Kern County Environmental Health Services Division implements the Unified Program for businesses to comply with the following requirements:

- Hazardous Material Response Plans and Inventory Program;
- UFC Plans and Inventory requirements;
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment Programs;
- CalARP Program;
- UST Program; and
- Aboveground Petroleum Storage Tank SPCC Plan.

These forms provide the County with information about the hazardous materials, regulated substances, storage tanks, and hazardous waste generated at a facility. This hazardous material inventory requires a description of all hazardous materials that would be stored on site, how much is stored on a daily basis, and the type of storage container. In addition, the amount and type of hazardous wastes generated, how it is stored, and how it is disposed of must be provided as well.

Businesses also must provide a Consolidated Contingency Plan which must be implemented whenever there is a fire, explosion, or release of hazardous material or waste that could threaten public health or the environment. The plan must detail the business' standard operating procedures for addressing potential releases including prevention measures and how a spill would be stopped and cleaned up. Included must be a list of available emergency equipment and the training that personnel must receive. Also included are site maps to identify where hazardous materials and wastes are stored and where emergency response equipment is located as well as emergency evacuation routes.

Adherence to the regulations and requirements described in the preceding paragraphs would limit the potential for exposure from routine use of hazardous materials during operations such that unhealthful levels of exposure by workers at a work site, or to the general public located outside of Project work areas, would not be expected. Furthermore, adherence to these regulations and requirements would limit the potential for hazardous material to be released to the environment due to routine use. In general, adherence to these requirements would result in routine use related to Project operations having a low likelihood of health or environmental consequences from exposure to a hazard by the public offsite or to construction workers on site.

Other Wastes

An estimated 1,610 pounds of Non-RCRA drilling wastes, including drilling muds, drill cuttings, wash water, and other related waste, would be generated per well drilled in in Kern County. The actual amount would depend on the depth of the well.

In the 2015 Oil and Gas Draft EIR, Section 3.5.3, *Construction Activities in Detail*, the different solid wastes generated during oil and gas field activities are described, as is how such nonhazardous solid wastes are disposed of on or offsite. Methods used include: injection wells; on-site burial in pits and landfills; land treatment; evaporation; surface discharge; and recycling. All disposal methods would have to comply with local, state, and federal regulations.

Summary

Regulations governing the transportation of hazardous material via truck and pipelines are comprehensive and serve to prevent or mitigate releases of hazardous materials in many situations. Nevertheless, potential releases have the potential to contaminate the environment or expose the public to hazardous materials and, therefore, the impacts could be significant.

The use, handling, and storage of hazardous materials is also regulated. Despite the implementation of federal and state regulations (such as under RCRA and California Hazardous Waste Laws), releases or spills have the potential to occur with implementation of the project. Since these potential releases could contaminate the environment or expose the public to hazardous materials, the impacts could be significant.

With implementation of MM 4.9-1 through MM 4.9-3, MM 4.9-7, MM 4.9-8, and MM 4.9-9 through MM 4.9-12, project operation would not create a significant hazard to the public or the

environment through the routine transport, use, or disposal of hazardous materials, and impacts would be less than significant.

Mitigation Measures

MM 4.9-1 Prior to The Owner/operator shall provide a comprehensive Worker Environmental Awareness Program to the County with its first CCS project-related permit application in each calendar year. The program shall include all training requirements identified in Owner/operator Best Management Practices and mitigation measures and include training for all field personnel (including Owner/operator employees, agents and contractors). The Worker Environmental Awareness Program 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. The Worker Environmental Awareness Program shall be provided to the surface owner at the time of the application pathway process so the surface owner may educate employees as well.

MM 4.9-2 The Owner/operator shall arrange for transportation, storage, and disposal of all hazardous materials in compliance with the Hazardous Materials Transportation Act. Drivers transporting hazardous materials or wastes should follow the measures recommended by the Federal Motor Carrier Safety Administration for avoiding roll-over accidents which include the following standards for cargo tank trucks:

a. Avoid sudden movements that may lead to roll-overs.

b. Maintain control of the load in turns and on straight roadways.

c. Identify in advance of transport high risk areas on designated roads.

d. Follow driver mandates for being alert and attentive behind the wheel.

e. Control speed and maintain proper "speed cushions" described by the Federal Motor Carrier Safety Administration.

MM 4.9-3 The Owner/operator shall implement the following practices based on practices and standards established by the United States Department of Labor Occupational Safety and Health Administration (OSHA) safety standards and as amended or modified by the State of California Department of Industrial Relations, Division of Occupational Safety and Health (DOSH – Cal/OSHA) and the Kern County Fire Department.

a. Construction activities shall be conducted to allow for easy clean-up of spills. Construction crews shall have the appropriate number of tools, supplies, and absorbent and barrier materials to contain and recover spilled materials.

b. Fuels and lubricants shall be stored only at designated staging areas. Fuel and lubricant tanks shall have secondary spill containment (e.g., curbs). Compliance with laws and regulations is required, including compliance with hazardous materials and hazardous waste storage laws, as applicable.

c. Storage of fuel and lubricants in the staging area shall be at least 100 feet away from the edge of water bodies. Refueling and lubrication of equipment shall be restricted to upland areas at least 100 feet away from stream channels and wetlands.

d. Any fuel truck shall carry an oil spill response kit and spill response equipment at all times.

e. Owner/operator shall be required to perform all routine equipment maintenance at the well pad or other suitable locations (i.e., maintenance yards), and promptly collect and lawfully dispose of wastes in compliance with existing regulatory requirements.

f. Berms and/or dikes (secondary containment) shall be constructed around the permanent above-ground bulk tanks and the foundations shall be installed with a passive leak detection system, so that potential spill materials shall be contained and collected in specified areas isolated from any water bodies. Tanks shall not be placed in areas subject to periodic flooding or washout. Compliance with laws and regulations is required, including compliance with hazardous materials and hazardous waste storage laws as applicable, including for secondary containment, such as Geologic Energy Management Division regulation (Title 14, C.C.R. § 1773.1), which requires secondary containment in "an engineered impoundment such as a catch basin, which can include natural topographic features, that is designed to capture fluid released from a production facility."

g. The appropriate amount and supply of sorbent and barrier materials shall be maintained on construction sites consistent with the type and level of construction activities. Sorbent and barrier materials shall also be utilized to contain runoff from contaminated areas consistent with Cal/OSHA regulations.

h. Shovels and drums shall be stored at each well pad or be readily available. If small quantities of soil become contaminated, hand tools shall be used to collect the soil and the material shall be stored in storage drums. Large quantities of contaminated soil may be bio-remediated on-site or at a designated remediation facility, subject to government approval, or collected utilizing heavy equipment, and stored in drums or other suitable containers prior to disposal. Should contamination occur adjacent to staging areas as a result of runoff, shovels and/or heavy equipment shall be utilized to collect the contaminated material. Contaminated soil shall be disposed of in accordance with state and federal regulations.

i. Above-ground tanks, valves and other equipment shall be visually inspected monthly and when the tank is refilled. Inspection records shall be maintained. Owner/operator s shall periodically check tanks for leaks or spills.

j. Drain valves on all tanks shall be locked to prevent accidental or unauthorized discharges from the tank.

k. Equipment maintenance shall be conducted in staging areas or other suitable locations (i.e., maintenance shops or yards).

l. The Owner/operator shall maintain equipment in operating condition to reduce the likelihood of fuel or oil line breaks and leakage. Any vehicles with chronic or continuous leaks shall be removed from the site and repaired before being returned to operation.

MM 4.9-4 All CCS related CO_2 facility pipelines shall require construction permit site plan review by the Kern County Planning and Natural Resources Department. With the exception of necessary connections directly to the capture or injection facility, all portions of the CO_2 pipeline shall be undergrounded within a defined corridor.

The site plan shall include the full location of the facility pipeline, width of easement for the pipeline, location and spacing of automatic shut off values, location of infra-red cameras for monitoring, construction and coatings used for the pipeline and all other requirements of Federal and State regulations. Specific safety fencing shall be provided for pipeline protection. General reference to "compliance with regulations "will not be considered sufficient. The site plan package shall concurrently be submitted to the Kern County Planning and Natural Resources Department, Kern County Fire Marshall and California State Fire Marshall for review and approval.

The plan shall include all details and features to show compliance with 49 CFR Part 195. The U.S. Department of Transportation (U.S. DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA) has delegated CO_2 pipeline oversight to the State Fire Marshall, who will evaluate pipelines for compliance with PHMSA. All costs for review by all parties shall be borne by the Owner/operator.

The Owner/operator shall notify the Kern County Public Health Services Environmental Health Division, Certified Union Program Agency (CUPA), surface landowner, and sensitive receptors located within 300 feet, of any hazardous materials/waste release, other than CO_2, immediately upon discovery, and to other applicable agencies as required by other laws. The Owner/operator shall immediately contain the leak (e.g., by isolating or shutting down the leaking equipment), clean up contaminated media (e.g., soils), and repair the leak prior to recommencing operations. The Owner/operator shall report the status and progress of the leak repair and remediation work to the County and the CUPA on monthly

intervals or predetermined intervals until the repair has been completed. Contaminated media shall be analyzed according to 22 C.C.R. §§ 66261.21-66261.24 for determination of hazardous waste disposal subject to the Hazardous Waste Determination procedures provided in 22 C.C.R. §66262.11.

MM 4.9-5 Prior to initiation of ground disturbing activities, the Owner/operator shall complete Phase II ESA activities within areas of ground disturbance. Develop a Soil Management Plan for implementation during Project construction activities to properly manage affected soils/wastes that are encountered during ground disturbing activities.

MM 4.9-6 If, during grading or excavation work, the Owner/operator observes evidence of contamination or if soil contamination is suspected, work near the excavation site shall be terminated, the work area cordoned off and required health and safety procedures implemented for the location by the contractor's Health and Safety Officer. Samples shall be collected by a trained and qualified individual. Analytical data from suspected contaminated material shall be reviewed by the contractor's Health and Safety Officer. If the sample testing determines that contamination is not present, work may proceed at the site; however, if contamination is detected above regulatory limits, the Kern County Public Health Services Department shall be notified. All actions related to encountering unanticipated hazardous materials at the site shall be documented and submitted to the Kern County Public Health Services Department for legal direction from the regulatory agency.

MM 4.9-7 The Owner/operator shall implement measures to prevent the release or accidental spillage of solid waste, garbage, construction debris, sanitary waste, industrial waste, naturally occurring radioactive materials, oil and other petroleum products, and other wastes into water bodies or water sources, including all applicable practices listed below. Other standards may also be utilized, provided that a professional engineer, certified industrial hygienist or certified safety professional certifies to the County that such standards are as or more protective of human health and the environment, as compared to the standards in the referenced Environmental Protection Agency manual. The following are practices and standards that shall be implemented.

a. Classify the various wastes for disposal as described in United States Environmental Protection Agency 2002, and in accordance with applicable California laws and regulations.

b. Size reserve pits to avoid overflows.

c. Use closed loop mud systems with oil-based muds except in compliance with State Water Resources Board or Regional Water Quality Control Board requirements as provided in Mitigation Measure 4.9-3.

d. Review safety data sheets of materials used and use the less toxic material for the operation.

e. Design systems with the smallest volumes possible (e.g., drilling mud systems).

f. Reduce the amount of excess fluids entering reserve and production pits.

g. Keep non-exempt wastes out of reserve or production pits.

h. Design the drilling pad to contain stormwater and rigwash.

i. Recycle and reuse oil-based muds and high-density brines when such recycling and reuse complies with hazardous waste laws and recycling laws.

j. Perform routine equipment inspections and maintenance to prevent leaks or emissions.

k. Reclaim oily debris and tank bottoms when such reclamation complies with hazardous waste laws and recycling laws.

l. Store only the volume of materials at facilities necessary for permitted work.

m. Construct berms around materials and waste storage areas that meet engineering standards to contain spills.

n. Perform routine inspections of materials and waste storage areas to locate damaged or leaking containers.

o. Train personnel in all waste management practices required by the mitigation measures, all legal standards and the permits issued by Kern County, CalGEM and all regulatory agencies.

MM 4.9-8 The following specific measures should be implemented at a minimum when conducting CCS development activities, as applicable:

a. Impervious secondary containment, such as containment dikes, containment walls, and drip pans shall be constructed and maintained around all qualifying petroleum facilities, including tank batteries and separation, and treating areas consistent with the Environmental Protection Agency's Spill Prevention, Control, and Countermeasures regulation (40 Code of Federal Regulations 112). The containment structure must have sufficient volume to contain, at a minimum, the content of the largest storage tank containing liquid hydrocarbons within the facility/battery and engineered freeboard to contain precipitation. Drip pans shall be routinely checked and cleaned of petroleum or chemical discharges and designed to prevent access by wildlife and livestock.as determined by the qualified biologist.

b. Chemical containers shall not be stored on bare ground and shall be maintained in good condition and shall be placed within secondary containment in case of a spill or high velocity puncture.

c. Containment dikes are not to be constructed with topsoil or coarse, insufficiently impervious spoil material that is insufficiently impervious to meet requirements. Containment is strongly suggested for produced water tanks. Chemicals shall be placed within secondary containment and stored so that the containers are not in contact with soil or standing water and product and hazard labels are not exposed to weathering.

d. Maintain a clean well location. Remove trash, junk, and other materials not in current use.

MM. 4.9-9 Prior to commencement of any construction or grading, the Owner/operator is required to provide written evidence of all of the following requirements:

1. Issuance of an EPA UIC Program Construction permit
2. Compliance with all applicable conditions of the approved Conditional Use Permit
3. Compliance with all applicable requirements of the adopted Mitigation Measure and Reporting Program.

MM 4.9-10 Prior to commencement of any testing or full operation to inject CO_2, the Owner/operator is required to provide written evidence of all of the following requirements:

1. Written correspondence from the Environmental Protection Agency (Region 9) UIC program to the Kern County Planning and Natural Resources Department that the Owner/operator has fully complied with all requirements of the EPA issued UIC CCS Program permit and EPA is authorizing commencement of injection, for testing or commencement of injection for full operations.
2. Compliance with all applicable conditions of the approved Conditional Use Permit
3. Compliance with all applicable requirements of the adopted Mitigation Measure and Reporting Program.

MM 4.9-11 All sources that provide CO_2 for injection to the Carbon Terra vault (Kern County) project must have been disclosed to the Kern County Planning and Natural Resources Department and EPA in writing and be legally permitted to operate by the county or city where they are located.

MM 4.9-12 No confidential information or sources may be used in the operation of this facility. All information provided to the Federal government or State of California regarding construction or operation of the facility or incidents at the facility shall be reported concurrently to the Kern County Planning and Natural Resources Department. In the case of emergencies or releases, the information shall be

communicated immediately upon discovery to the Kern County Fire Marshall and Public Health with reports to the Kern County Planning and Natural Resources Department within 24 hours after.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.9-2: 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

The public and/or the environment could be affected by the release of hazardous materials from accidents or improper handling or disposal of fuels or other hazardous materials. Spills, release, overflow of tanks, or breach of containment can occur from operator error or limited storage capacity; water ingress from stormwater or floods; poor construction or failure of tanks and/or liners, or pipeline failure. A spill or release could expose workers and the public to levels of hazardous materials in excess of applicable regulations.

As discussed above under Impact 4.9-1, all operators are required to maintain hazardous materials in staging or storage areas in proper storage containers and with sufficient secondary containment in accordance with federal and state regulations. Facility pipelines must be operated according to PHMSA regulations.

Construction

As discussed in Impact 4.9-1 above, an accidental release of hazardous materials (e.g., oils, fuels, paints) during construction of the project could result in the exposure of construction workers, the public, and/or the environment to hazardous materials. However, compliance with existing regulations regarding the management, transport, and disposal of hazardous materials, as discussed under Section 4.9.3, *Regulatory Setting*, and MM 4.9-1 through MM 4.9-3, would be implemented to avoid the potential for accidental spills, leaks, and/or improper disposal of hazardous materials during construction of the project. Additionally, MM 4.9-14 would be implemented to ensure safe drilling and drill casing practices, well design, and construction.

As discussed above, construction projects that disturb one acre or more of land would be subject to the requirements of the NPDES Construction General Permit, which requires preparation and implementation of a SWPPP to reduce the risk of spills or leaks that might reach the environment, including procedures to address minor spills of hazardous materials. Measures to control spills, leakage, and dumping must be addressed through structural as well as nonstructural BMPs. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In addition, MM 4.9-7 would require measures to prevent the release or accidental spillage of hazardous materials into water bodies or water sources. Although less frequent, project-related ground disturbance could encounter contaminated soil, sediment, or groundwater that would expose workers, the

public, or the environment to hazards if adequate precautions are not taken (see Impact 4.9-4 for further discussion of potential impacts).

The disturbance of contaminated soil, if encountered during construction activities could result in impacts on public and/or the environment because soil containing hazardous materials could be released into the environment, and the movement of contaminated soil could spread contamination to new areas. Therefore, the potential release of subsurface hazardous materials into the environment during construction of the project is a significant impact. However, implementation of MM 4.9-5 and MM 4.9-6 would be implemented to reduce impacts. Furthermore, MM 4.9-15 would be implemented, which requires the notification of any project-related contamination within 24 hours of the discovery to the Kern County Public Health Environmental Health Division, Kern County Planning and Natural Resources Department and all State and federal implementing regulatory agencies.

As discussed above, all operators are required to maintain hazardous materials in staging or storage areas in proper storage containers and with sufficient secondary containment in accordance with federal and state regulations.

Operation

Project operations would consist of limited hazardous materials on the site. As discussed in Impact 4.9-1 above, any routine transport, use, and disposal of these materials during project operations must adhere to federal, State, and local regulations for transport, handling, storage, and disposal of hazardous substances. In addition, implementation of MM 4.9-13 requires the preparation of a Hazardous Materials Business Plan that would require annual worker training requirements. Furthermore, hazardous materials/chemicals (e.g., herbicides for vegetation management) in low quantities do not pose a significant threat related to the release of hazardous materials into the environment.

As discussed in Impact 4.9-1 above, impacts during normal operations of the project would be limited to personnel directly involved in project operations and maintenance. Impacts to personnel, public, and the environment from CO_2 leakage could occur during capture, transport, or storage.

As described in Appendix F (Hazards and Hazardous Materials Technical Documentation) of this EIR, CRC reviewed the project for potential hazards/risks and developed a range of CO_2 leakage scenarios that could result in a significant hazard to the public or the environment. Each of the potential hazards/risks for CO_2 leakage was characterized with probability of occurrence and severity of potential consequence.

Overall, adherence to regulations and standard protocols during the storage, transportation, and usage of any hazardous materials, and implementation of MM 4.9-1 through 4.9-3, MM 4.9-5 through MM 4.9-7, and MM 4.9-13 through MM 4.9-15 would minimize or reduce potential impacts related to reasonably foreseeable upset and accident conditions involving the release of hazardous materials, to less than significant.

Mitigation Measures

Implement MM 4.9-1 through 4.9-3 and MM 4.9-5 through MM 4.9-7**,** as described above**,** and

MM 4.9-13 As part of the Hazardous Materials Business Plan and the spill prevention, control, and Countermeasures Plan, the Owner/operator shall require annual worker training requirements to: increase awareness of the most common types of failures and methods to avoid mistakes, shall maintain records of employee training, and shall make such records available to the County for review upon request.

MM 4.9-14 The Owner/operator shall comply with the California Geologic Energy Management Division requirements for assuring safe drilling and drill casing practices, well design, construction and well management requirements, blowout requirements, and all other provisions of 14 California Code of Regulations 1744 and other applicable Geologic Energy Management Division regulations to any wells being abandoned as a result of the CCS project. The Owner/operator shall also reduce the incidence of well control loss by following the practices described in Recommended Practice for Well Control Operations.

MM 4.9-15 The Owner/operator shall report project-related contamination, including previously unknown injection wells, of a reportable quantity of hazardous substances, as specified in the Code of Federal Regulations Title 40 and/or the California Code of Regulations Titles 22 and 23, which is discovered during Project construction activities and operations. Notification must be made within 24 hours of discovery to Kern County Public Health Environmental Health Division, Kern County Planning and Natural Resources Department and all State and Federal implementing regulatory agencies that have responsibility or oversight of the specific contamination conditions and activity. The Owner/operator shall remediate such contamination as required by the Kern County Environmental Health Division and the appropriate implementing regulatory agency.

Level of Significance After Mitigation

Impacts would be than significant.

Impact 4.9-3: Emit Hazardous Emissions or Handle Hazardous or Acutely Hazardous Materials, Substances, or Waste within 1/4 Mile of an Existing or Proposed School

The CEQA requires that proposed projects near schools evaluate potential health impacts resulting from the emission of or handling of hazardous or acutely hazardous material, substances, or waste. This also includes extremely hazardous materials and wastes. Emissions associated with the implementation of the project and potential risks associated with emissions of toxic air contaminants are addressed in Section 4.3, *Air Quality*. This discussion focuses on hazardous and acutely hazardous materials, substances, or wastes.

Definitions for extremely hazardous materials and wastes and acutely hazardous materials are provided below.

- "Extremely hazardous material" means a substance or combination of substances which, if human exposure should occur, may likely result in death, disabling personal injury or serious illness caused by the substance or combination of substances because of its quantity, concentration, or chemical characteristics.
- "Extremely hazardous waste" means any hazardous waste or mixture of hazardous wastes which, if human exposure should occur, may likely result in death, disabling personal injury or serious illness caused by the hazardous waste or mixture of hazardous wastes because of its quantity, concentration or chemical characteristics (Title 19 CCR).
- Acutely hazardous materials include chemicals at or above the specified threshold quantities or a process which involves a Category 1 flammable gas or a flammable liquid with a flashpoint below 100 ºF (37.8 ºC) on site in one location, in a quantity of 10,000 pounds (4535.9 kg) or more according to 8 CCR Section 5189.

Some of the acutely hazardous materials that would be used by the project are those associated with capture facilities including diluted amine, concentrated amine, caustic, sulfuric acid, calcium chloride, triethylene glycol, corrosion inhibitors, scale inhibitors, brominated biocide, sodium hypochlorite, and citric acid. Each of these chemicals are classified as hazardous under the criteria of the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

During all phases of activities, acutely or extremely hazardous materials would have to be transported according the Hazardous Materials Transport Act, handled and stored according to OSHA and California Fire Code, and disposed of according to RCRA and California Hazardous Waste regulations. Most CCS activities do not require the long-term storage of hazardous or acutely hazardous materials. Some of these types of chemicals would be used during acid-based WST operations defined by SB 4, as well as non-SB 4 routine maintenance operations and generally during the production process.

As described above in Section 4.9.2, *Environmental Setting*, the closest school to the project site is McKittrick Elementary School, located approximately 2.8 miles west of the project site (see Table 4.9-5). California State law requires that new schools not be located near an aboveground water or fuel storage tank or within 1,500 feet (0.28 miles) of the easement of an aboveground or underground pipeline that can pose a safety hazard as determined by a risk analysis study. Therefore, new schools would not be sited near CCS operations or pipelines. Although state and federal regulations safeguard the handling of acutely hazardous materials during routine operations and these should prevent releases, accidents do occur. Schools and other locations where people congregate are particularly vulnerable to accidents. Implementation of MM 4.9-16 would be implemented to reduce impacts to a less than significant level.

Mitigation Measures

MM 4.9-16 The Owner/operator shall provide a written notice of the specific location of the approved CCS project Surface Land Area using a map along with Assessor Parcel Numbers (APN) and sections with a link to the Kern County Planning and Natural Resources website all of the following agencies:

a) All local school districts within 20 miles

b) California Division of State Architect

c) California Department of Education.

The notice shall be sent within 60 days of the date of the approval of the project and annually by January 31. A final letter shall be sent when the project is decommissioned with information on the responsible party managing the closed facility.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.9-4: Be Located on a Site Which is Included on a List of Hazardous Materials Sites Compiled Pursuant to Government Code § 65962.5 and, as a Result, Would Create a Significant Hazard to the Public or the Environment

Government Code Section 65962.5 requires CalEPA to compile a hazardous materials release sites called the Cortese List. This list is housed in a database called ENVIROSTOR. As described in Section 4.9.2, *Environmental Setting*, listed hazardous waste or hazardous substance sites are known to have occurred within the project area. Status of four of the sites is "open", and a site assessment or remedial action is occurring at each of those the sites.

Project construction would include clearing, mowing, excavation, and grading, and drilling of wells. The use of heavy equipment such as earthmovers, scrapers, excavators, dozers, water trucks, paddlewheels, haul vehicles, and graders would likely be used in site preparation. In addition, trenching would be required to enable the placement of facility pipeline. Such activities involving ground disturbance could occur on or in the vicinity of documented hazardous materials sites that are listed pursuant to California Government Code Section §65962.5. Were this to occur, construction workers, the public, and the environment could be subjected to potential hazards from disturbed contaminated soils on the site, which would be a significant impact. Additionally, unearthing of pre-existing contaminated soil at an identified hazardous waste site, causing pre-existing contamination in one groundwater aquifer to enter another, or disturbing formerly contaminated areas that have been capped has the potential to expose the public or the environment to contamination and therefore impacts could be a significant impact. However, implementation of MM 4.9-5 would properly manage affected soils/wastes that are encountered during ground disturbing activities. In addition, implementation of MM 4.9-6 would require the sampling of soils in the event that the Owner/operator observes evidence of contamination or if soil contamination

is suspected during grading or excavation work. Therefore, impacts would be less than significant with mitigation.

Mitigation Measures

Implement MM 4.9-5 and MM 4.9-6, as described above.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.9-5: For a project located within the adopted Kern County Airport Land Use Compatibility Plan, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

The project area is not located within an area covered by the Kern County ALUCP. The nearest airport to the project site is Elk Hills-Buttonwillow Airport, located approximately 2 miles north of the project site. Safety hazards are not anticipated for people residing or working in the project area with respect to the project's proximity to an airport.

Drilling rigs for injection wells and potentially other CCS-related facilities could exceed height limits FAA height limits. Lighting on drilling rigs, tanks, roads, pumps, and other facilities could exceed restrictions on lighting type, design, and placement. Whether these facilities or activities would pose a hazard to navigation would be determined by the FAA in response to notification of that agency of a proposed project. Therefore, CCS development related equipment heights and lighting placement/design could create a significant hazard to aviation safety, with attendant potential impacts to people and the environment, in the vicinity of a public use airport. However, implementation of MM 4.9-17 would be implemented to reduce impacts to a less than significant level.

Mitigation Measures

MM 4.9-17 The Owner/operator shall determine whether any proposed construction or alteration meets requirements for notification of the Federal Aviation Administration. If a proposed construction or alteration is found to require notification, the Owner/operator shall notify the Federal Aviation Administration and request that the Federal Aviation Administration issue a Determination of No Hazard to Air Navigation. If the Federal Aviation Administration determines that the construction or alteration would result in a potential hazard to air navigation, the Owner/operator would be required to work with the Federal Aviation Administration to resolve any adverse effects or airport operations. The Owner/operator shall notify the Federal Aviation Administration and the nearest Airport, by completing and submitting Federal Aviation Administration Form

7460-1 if CCS project components or associated development activities are planned that meet one or more of the following criteria:

a. Any construction or alteration exceeding 200 feet above ground level.

b. Any construction or alteration within 20,000 feet of all public use airports except Poso-kern Airport which exceeds a 100:1 surface from any point on the runway.

c. Any construction or alteration within 10,000 feet of the Poso-Kern Airport which exceeds a 50:1 surface from any point on the runway.

d. Any construction or alteration within 5,000 feet of a public use heliport which exceeds a 25:1 surface.

e. When requested by the Federal Aviation Administration.

f. Any construction or alteration located on a public use airport or heliport regardless of height or location.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.9-6: Impair Implementation of, or Physically Interfere with, an Adopted Emergency Response Plan or Emergency Evacuation Plan

Construction

The only emergency response plan in place in the County is for evacuation if the Lake Isabella Dam fails. The project area is not within an adopted emergency response plan or emergency evacuation plan. However, the project would generate construction trips, including the movement of oversize equipment, and the potential for roadway lane closures exist to the sites during construction. These factors could temporarily increase the daily traffic volumes on surrounding local roadways and at intersections. It is anticipated that emergency access would be maintained at all times, and appropriate detours would be provided, as necessary.

While the project would not require closures of public roads, which could inhibit access by emergency vehicles, during construction, heavy construction-related traffic could interfere with emergency response or emergency evacuation procedures in the event of an emergency, such as a wildfire or a chemical spill. Heavy construction-related traffic could also interfere with emergency response to other uses in the vicinity and, therefore, could represent a significant impact.

As described in Section 4.17, *Transportation*, implementation of MM 4.17-1 requires the preparation of a Construction Traffic Control Plan. Implementation of this mitigation measure would minimize the potential for the project to interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, this impact would be less than significant with mitigation.

Operation

As discussed in Impact 4.9-1 above, the potential risk of CO_2 leakage would be a significant impact. Thus, could result in an increase in demand for emergency response and interfere with emergency response to other uses in the vicinity. However, as required by MM 4.9-18, the project proponent would prepare and implement an emergency incident response plan that that addresses emergency medical response.

Therefore, this impact would be less than significant with mitigation.

Mitigation Measures

Implement MM 4.17-1 (see Section 4.17, *Transportation*), and

MM 4.9-18 Prior to commencement of any injection of CO_2, and in addition to the emergency response plan required by the EPA UIC permit, the Owner/operator shall prepare an emergency incident response plan that addresses, advance leak detection methods and communication with fire responders, emergency medical response, Kern County Fire and Kern County Sheriff notification and protocols for incident management. The plan shall be reviewed and approved by the Kern County Fire Department in consultation with EPA UIC Program, State of California Fire Marshall, Kern County Sheriff and all other State agencies identified by the California Air Resources Board.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.9-7: Expose People or Structures, Either Directly or Indirectly, to a Significant Risk of Loss, Injury, or Death Involving Wildland Fires

The project site is not located within a high fire hazard severity zone (CAL FIRE 2020a); see Section 4.20, *Wildfire*. However, there is combustible vegetation on and around the project site that would be actively managed during both the construction and operation phases to minimize fire risk. Combustible vegetation would be either limited in height or removed primarily through a combination of dirt or gravel firebreaks, grazing, and mowing. Vegetation management involving the operation of mechanical equipment and/or the use of fuel or other flammable substances, would occur on and around the project site, thereby increasing the potential for igniting a brush fire and triggering a wildland fire.

To minimize fire risk from project construction and operation, particularly for vegetation management activities, the project would require implementation of MM 4.9-19, which would require the project to comply with applicable existing codes and ordinances related to the maintenance of mechanical equipment, handling and storage of flammable materials, and cleanup of spills of flammable materials. In addition, implementation of MM 4.9-20 would require a Worker Environmental Awareness Program that include fire prevention and response training for workers

using specific equipment and tools. With implementation of these two measures, impacts would be less than significant.

See Section 4.20, *Wildfire*, of this EIR for additional discussion of wildfire issues.

Mitigation Measures

MM 4.9-19 The Owner/operator is required to implement the following measures:

a. Comply with Kern County Fire Codes.

b. Maintain firefighting apparatus and supplies required by the Kern County Fire Department.

c. Maintain of a list of all relevant fire-fighting authorities for each work site.

d. Have available equipment to extinguish incipient fires and or construction of a fire break, such as: chemical fire extinguishers, shovels, axes, chain saws, etc.

e. Carry water or fire extinguishers and shovels in non-passenger vehicles in the field.

f. Have and maintain a supply of fire extinguishers for welding, grinding, and brushing crews in compliance with the in compliance with Cal/OSHA regulations.

g. Use available resources to protect individual safety and to contain any fire that occurs and notify local emergency response personnel.

h. Remove any flammable wastes generated during oil and gas activities regularly.

i. Store all flammable materials used in oil and gas activities away from ignition sources and in approved containers.

j. Allow smoking only in designated smoking areas.

k. Prohibit smoking where flammable products are present and when the fire hazard is high. Train personnel regarding potential fire hazards and their prevention.

l. All internal combustion engines, stationary and mobile, shall be equipped with spark arresters. Spark arresters shall be in good working order.

m. Light trucks and cars with factory-installed (type) mufflers shall be used only on roads where the roadway is cleared of vegetation. Said vehicle types shall maintain their factory-installed (type) muffler in good condition.

n. Fire rules shall be posted on the Project bulletin board at the contractor's field office and areas visible to employees.

o. Equipment parking areas and small stationary engine sites shall be cleared of all extraneous flammable materials.

p. Personnel shall be trained in the practices of the Fire Safety Plan relevant to their duties. Construction and maintenance personnel shall be trained

and equipped to extinguish small fires in order to prevent them from growing into more serious threats.

MM 4.9-20 The Owner/operator should restrict the use of chainsaws, chippers, vegetation masticators, grinders, tractors, torches, and explosives at its locations, and ensure the sites where this equipment is used are equipped with portable or fixed fire extinguishers and/or a water tank, with hoses, fire rakes, and other tools to extinguish and or control incipient stage fires. The Worker Environmental Awareness Program shall include fire prevention and response training for workers using these tools.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.9-8: Would implementation of the project generate vectors (flies, mosquitoes, rodents, etc.) or have a component that includes agricultural waste? Specifically, would the project exceed the following qualitative threshold: the presence of domestic flies, mosquitoes, cockroaches, rodents, and/or any other vectors associated with the project is significant when the applicable enforcement agency determines that any of the vectors:

i. Occur as immature stages and adults in numbers considerably in excess of those found in the surrounding environment; and

ii. Are associated with design, layout, and management of project operations; and

iii. Disseminate widely from the property; and

iv. Cause detrimental effects on the public health or well-being of the majority of the surrounding population.

Project activities would not result in features or conditions that could potentially provide habitat for vectors, such as the generation of agricultural or food waste; however, implementation of the project would involve construction and operations that could result in standing water, trash piles, or open containers that could provide breeding areas for mosquitoes, flies, or rodents. Project waste may include scrap metal and concrete, empty nonhazardous containers, vegetation waste, food waste from workers, wood, glass, paper, plastics, other forms of solid waste that could result in standing water, trash piles, or open containers that could provide breeding areas for mosquitoes, flies, or rodents. These potential disease vectors could pose a potential hazard to personnel or the public and result in a potentially significant impact. However, implementation of MM 4.9-21 would require the storage and removal of trash in closed containers, prevent standing water accumulation,

and obtain permits from regulatory agencies before draining or filling naturally occurring depressions or pools. Therefore, impacts would be less than significant with mitigation.

Mitigation Measures

MM 4.9-21 Owner/operator shall ensure that trash is stored in closed containers and removed from the site at regular intervals. Open containers shall be inverted, and construction ditches shall not be allowed to accumulate water. Construction and maintenance operations shall not generate standing water. Naturally occurring depressions, drainages, or pools at the site shall not be drained or filled without a permit from any regulatory agency having jurisdiction over the resource location.

Level of Significance After Mitigation

Impacts would be less than significant.

4.9.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed in amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, SB 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year.

In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. CalGEM permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts associated with hazards and hazardous materials is the project area. Because incidents with hazardous materials are, in general, confined to location where that has been a release or spill, the cumulative impact analysis considers the combined hazardous materials impacts associated with the project and with nearby related projects. The potential hazards associated with the operation of CCS activities are only expected to occur where capture facilities, facility pipelines and/or injection wells exist. Due to the nature of these operations, upset conditions at one CCS facility is unlikely to affect operations at adjacent CCS facility, and are unlikely to extend beyond oilfield boundaries. Therefore, the hazard impacts associated with the Proposed Project are not expected to overlap with other hazards.

Impact 4.9-9: Contribute to Cumulative Hazards and Hazardous Materials Impacts

With regard to the creation of a hazard through the routine transport, use, or disposal of hazardous materials (Impact 4.9-1), a potentially significant impact could result if a spill or leak were to occur during project construction or operation activities; however, compliance with state and county regulations and the mitigation measures outlined above would ensure that impacts would remain less than significant. This impact does not have the potential to combine with contamination from spills from other projects within 0.5 miles of the site to result in a cumulative impact due to the site- specific nature of soil contamination and the mitigation measures that would ensure proper cleanup and disposal of contaminated soil. Cumulative contamination of groundwater is discussed in Section 4.10, *Hydrology and Water Quality*. Therefore, impacts of the project would not be expected to make a cumulatively considerable contribution, in combination with impacts from past, present, or reasonably foreseeable projects, to result in a cumulative impact.

With regard to creation of a hazard through upset or accident conditions involving a hazardous material release (Impact 4.9-2), the potential exists for construction and operation activities, through the implementation of the project, to result in the release of hazardous materials in the soil resulting in exposure of personnel and other sensitive receptors to contaminant levels that could result in short-term and/or long-term health effects. Additionally, CO_2 leakage from pipelines could pose a hazard to personnel, public, and the environment; however, conformance with existing state and county regulations, project safety design features, and implementation of the mitigation measures identified above would render this impact less than significant. This impact does not have the potential to combine with impacts of other projects because of the localized nature of the impacts, and because appropriate safety, cleanup, and disposal methods would be implemented to reduce the impact to a level that would not combine with impact of other projects. Therefore, impacts of the project would not have the potential to make a cumulatively considerable contribution in combination with impacts from past, present, or reasonably foreseeable projects to result in a cumulative impact.

With regard to creation of a hazard to the public or the environment as a result of being located on a site that is included on a list of hazardous material sites compiled pursuant to Government Code § 65962.5 (Impact 4.9-4), although listed sites are located in the project area, implementation of MM 4.9-5 and MM 4.9-6 would ensure that the Applicant not only has a method to address unanticipated or project-related contamination, but they have also proactively evaluated whether there is a potential hazardous waste site where they would be operating and have made measure to avoid disturbing it. Therefore, impacts of the project would not have the potential to combine with impacts from past, present, or reasonably foreseeable projects to result in a cumulative impact.

With regard to the creation of a safety hazard for a project located within the Kern County ALUCP (Impact 4.9-5), the project does not occur within the Kern County ALUCP, and therefore, impacts of the project would not have the potential to make a cumulatively considerable contribution, in combination with impacts from past, present, or reasonably foreseeable projects, to result in a cumulative impact.

With regard to interference with an adopted emergency response plan or emergency evacuation plan (Impact 4.9-6), it would be unlikely that project-related activities would interfere with an adopted emergency response plan or emergency evacuation plan. The project's less-than-significant impact has the potential to combine with other current and future projects that would generate high volumes of traffic on area roadways by creating a cumulative traffic burden on regional roadways; however, given the overall rural nature of the project area, and implementation of MM 4.17-1 and MM 4.9-18 outlined above , the potential for a considerable contribution to a cumulative impact to emergency response is unlikely to occur, and would therefore be less than significant.

With regard to exposing people or structures to a wildland fire hazard (Impact 4.9-7), construction, operation, and maintenance would increase the likelihood of wildfire ignition; however, implementation of MM 4.9-19 and MM 4.9-20 outlined above would substantially reduce the possibility of a project-related ignition, rendering this impact less than significant. Mitigation would reduce this impact to a level that would not combine with other projects. Therefore, impacts of the project would not have the potential to make a cumulatively considerable contribution, in combination with impacts from past, present, or reasonably foreseeable projects, to result in a cumulative impact.

With regard to generating disease vectors (Impact 4.9-8), project construction and operation activities could attract other disease vectors by allowing standing water, trash piles, or open containers to accumulate at the project site, potentially resulting in a hazard to construction personnel or the general public. However, implementation of the MM 4.9-21 described above would reduce this impact to a less than significant level. Mitigation would reduce this impact to a level that would not combine with other projects, therefore, impacts of the project would not have the potential to make a cumulatively considerable contribution, in combination with impacts from past, present, or reasonably foreseeable projects, to result in a cumulative impact.

Mitigation Measures

Implement MM 4.9-1 through MM 4.9-21, as described above, risk reduction measures, as described in Section 4.7, *Geology and Soils*, and mitigation measures to maintain water quality, as described in Section 4.9, *Hydrology and Water Quality*.

Level of Significance After Mitigation

Cumulative impacts would be less than significant.

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Section 4.10

Hydrology and Water Quality

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Section 4.10

Hydrology and Water Quality

4.10.1 Introduction

This section of the Environmental Impact Report (EIR) describes the hydrological environmental and regulatory settings, addresses potential impacts, which would result from implementation of the California Resources Corporation's (project proponent's) proposed Carbon TerraVault I (Kern County) Project (project) on hydrology and water quality, and discusses mitigation measures to reduce impacts, where applicable. The project site is a specific set of parcels within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself (see Chapter 3, *Project Description*). Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

This section relies partially on technical documents by GEI Consultants and QK for the project—specifically, the Hydrology Report and Water Supply Assessment provided in Appendices G-1 and G-2 of this EIR, respectively. Additional information in this section is based, in part, on the Underground Injection Control (UIC) Permit Application submitted to the U.S. Environmental Protection Agency (EPA) Region 9 on August 30, 2021, and the UIC Class VI permit application submitted to the EPA on September 20, 2021 (included in Appendix E-2, respectively). The Hydrology Report prepared by GEI Consultants (see Appendix G-1) includes hydrology and water quality conditions within the project area and analyzes potential environmental impacts of implementing the project. The Water Supply Assessment for the project was prepared by QK (see Appendix G-2). The UIC Permit Application includes information regarding the project's potential impact to underground sources of drinking water and provides information regarding regulations required for injection of carbon dioxide (CO_2) underground for storage purposes. Results from the analyses are incorporated herein this section of the EIR.

4.10.2 Environmental Setting

Regional Setting

The project site is located in the southern portion of the San Joaquin Valley within the Tulare Lake Hydrologic Region (Tulare Lake Basin or "Basin"). The Basin is a triangle-shaped, topographically closed basin bordered to the east by the Sierra Nevada, to the west by the Coast Ranges, and to the south by the Tehachapi Mountains.

Tulare Lake Hydrologic Region

The California Department of Water Resources (DWR) has divided the state into 10 Hydrologic Regions. The project site is located within the Tulare Lake Basin. The Basin is ranked as "high priority" in a statewide ranking of groundwater importance. The Basin comprises the drainage area

of the San Joaquin Valley south of the San Joaquin River encompassing approximately 16,800 square miles (see Figure 4.10-1).

Kern County Groundwater Subbasin

The project site is located above the Kern County Hydrologic Region, for which the Kern Groundwater Authority (KGA) is the principal groundwater management agency. The Kern County Subbasin ("Subbasin") is the specific groundwater subbasin in which the project resides and has a surface area of approximately 1,945,000 acres. The Subbasin has a surface area of approximately 3,040 square miles.

The San Joaquin Valley represents the southern portion of the Great Central Valley of California. The San Joaquin Valley is a structural trough up to 200 miles long and 70 miles wide filled with up to 32,000 feet of marine and continental sediments deposited during periodic inundation by the Pacific Ocean and by erosion of the surrounding mountains, respectively. Continental deposits shed from the surrounding mountains forming an alluvial wedge that thickens from the valley margins toward the axis of the structural trough. This depositional axis is slightly west of the series of rivers, lakes, sloughs, and marshes that mark the current and historic axis of surface drainage in the San Joaquin Valley. Water bearing formations in the Subbasin are found in the shallow to intermediate depths of the groundwater Subbasin and are primarily continental deposits of Tertiary and Quaternary age.

The project area is in the western portion of the Subbasin within the Elk Hills oilfield, which comprises approximately 75 square miles (47,800 acres). The water bearing unit is the Tulare Formation, which contains up to 2,200 feet of interbedded, oxidized to reduced sands, and gypsiferous clays and gravels derived predominantly from Coast Range sources. The Elk Hills fold is identified as a restrictive structure that serves as a barrier to groundwater movement. Water quality is characterized as primarily sodium sulfate to calcium sodium sulfate type.

Climate

Climate in the region is characterized as arid to semi-arid with average annual precipitation of 6 to 7 inches per year. On average, the valley floor receives 8.32 inches of precipitation per year, most of which falls between November and April. Average temperatures are relatively high and total evaporation exceeds total precipitation. Winter is generally mild, but an occasional freeze does occur and may cause substantial agricultural damage. The majority of rainfall occurs between January and March. Summers are characterized as dry with high temperatures and low humidity. Average high temperatures range from 57.4 degrees Fahrenheit (°F) in January to 98.6°F in July. Average low temperatures range from 38.5°F in December and January to 69.2°F in July.

Figure 4.10-1: California Department of Water Resources Designated Groundwater Basins and Subbasins

FIGURE 4.10-1: Groundwater Basins and Subbasins

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A "water year" in California runs from September 30 to October 1 of the following year. California typically receives 50 percent of its precipitation in the months of December, January, and February in the form of snow in the Sierras. The snowpack in the Sierras typically stores water throughout the winter months and then releases it beginning in the spring.

Topography and Hydrology

The major topographic feature in the region is the southern San Joaquin Valley, where the topography is generally flat. Steeper, mountainous topography is present in the Sierra Nevada Mountains to the east, the San Emigdio and Tehachapi Mountains to the south, and the Coast Range Mountains to the west.

The natural hydrology of the Basin has been extensively modified over the last 150 years by irrigation, flood control, and land reclamation. Dams and reservoirs have been constructed on all of the large rivers that drain into the Basin for flood control, water supply, and hydroelectric generation. State, federal, local, and privately owned water conveyance facilities, such as aqueducts, pipelines, ditches, and canals, have also been constructed throughout the region to facilitate the movement of water into and out of the Basin.

The Kern River is the southernmost of the four major rivers in the Basin and is the major surface water feature in the Kern River Basin, flowing from the Sierra Nevada in the northeast to the Central Valley in the southwest. The riverbed extends through urban Bakersfield and is typically dry except during storm events and under wet hydrologic conditions when water is released upstream from Lake Isabella for flood management or local water banking purposes. Lake Isabella was created by a dam completed by the U.S. Army Corps of Engineers (USACE) in 1953. The Lake Isabella dam consists of the main dam and an auxiliary dam, which are located 2,000 feet apart. The dam is 33 miles east of the valley floor at the junction of the mainstem and south fork of the Kern River. The main earthfill dam is 185 feet high and 1,725 feet long, and the auxiliary earthfill structure is 100 feet high and 3,275 feet long. The gross storage capacity of both dams is 568,100 acre-feet. The total capacity may be operated to control snowmelt floods. As discussed in the next section, the dam is being managed by the USACE to reduce potential structural failure risks during an ongoing safety modification program that was substantially completed in 2022 (USACE 2023).

From the Lake Isabella dam, the Kern River flows southwest until it emerges from a deep canyon northeast of Bakersfield. Water flowing from the canyon is diverted into canals by several weirs for use in the city of Bakersfield. During wetter conditions, surface water is released downstream for groundwater recharge operations. Depending on the amount and timing of rainfall and snowmelt, surface water from the Kern River that is not diverted or used for groundwater recharge may ultimately flow into the Buena Vista lakebed, the Kern River Intertie, and the California Aqueduct, or north toward the historical Tulare Lake Basin via the flood canals. The westerly portions of the Kern River and several of the diversion, recharge, and flood facilities that capture or convey river flows are located within the region.

Poso Creek is located to the north of the Kern River and intermittently conveys rainfall and snowmelt from the Greenhorn Mountains to the valley floor. The creek flows west through the

region and terminates at the federally owned Kern National Wildlife Refuge in the northwest portion of the County. The primary constructed water conveyance facilities in the region are: (1) federally owned and operated facilities associated with the Central Valley Project, including the Friant-Kern Canal which transports water from Sierra Nevada streams, the Sacramento Delta, and other sources to Kern County; and (2) facilities associated with the California owned and operated State Water Project (SWP), including portions of the California Aqueduct, which transport water south to Kern County and other locations from the Sacramento Delta. Major groundwater recharge and storage facilities include the 30-square-mile Kern Water Bank, owned and operated by the Kern Water Bank Authority, the Pioneer Project (owned by the Kern County Water Agency), and storage and banking facilities that are owned and operated by several incorporated water districts in the region.

Project Area Setting

Hydrogeology

The project area is underlain with Tertiary and Quaternary Pliocene-Pleistocene non-marine sedimentary rocks consisting of loosely consolidated sandstone, shale, and gravel deposits (Figure 4.10-2). The Tertiary and Quaternary deposits underlying Elk Hills and nearby areas are up to 24,000 feet thick. The Tulare Formation lies at the surface of the Elk Hills and consists of alternating beds of non-marine sand, gravel, silt, and clay (most noticeably the Amnicola, Tulare, and Corcoran clay units). The Tulare Formation consists of both unsaturated and saturated zones. The upper units of the Tulare Formation are mostly unsaturated, but the lower units can be saturated with both water and oil.

The western anticline in the Elk Hills is believed to divert the movement of groundwater south through the Buena Vista Valley toward Buena Vista Lake. The shallow and eastern anticlines are considered “shallow wrinkles” and not regarded as having significant impacts to groundwater in the area. In addition to faults, barriers to groundwater movement include folds such as the Elk Hills, angular unconformities, and contacts with crystalline and consolidated sedimentary rocks at the Subbasin margins. Corcoran clay, which exists in the project area, significantly impedes vertical groundwater movement where present.

From ground surface to approximately 200 feet below ground surface is Undifferentiated Alluvium/Tulare Formation with air-filled sands. This is generally followed by layers of E-clay mixed with more Undifferentiated Alluvium/Tulare Formation until it transitions to the Upper Tulare Formation, Amnicola Clay, then Lower Tulare Formation.

Figure 4.10-2: Geologic Map

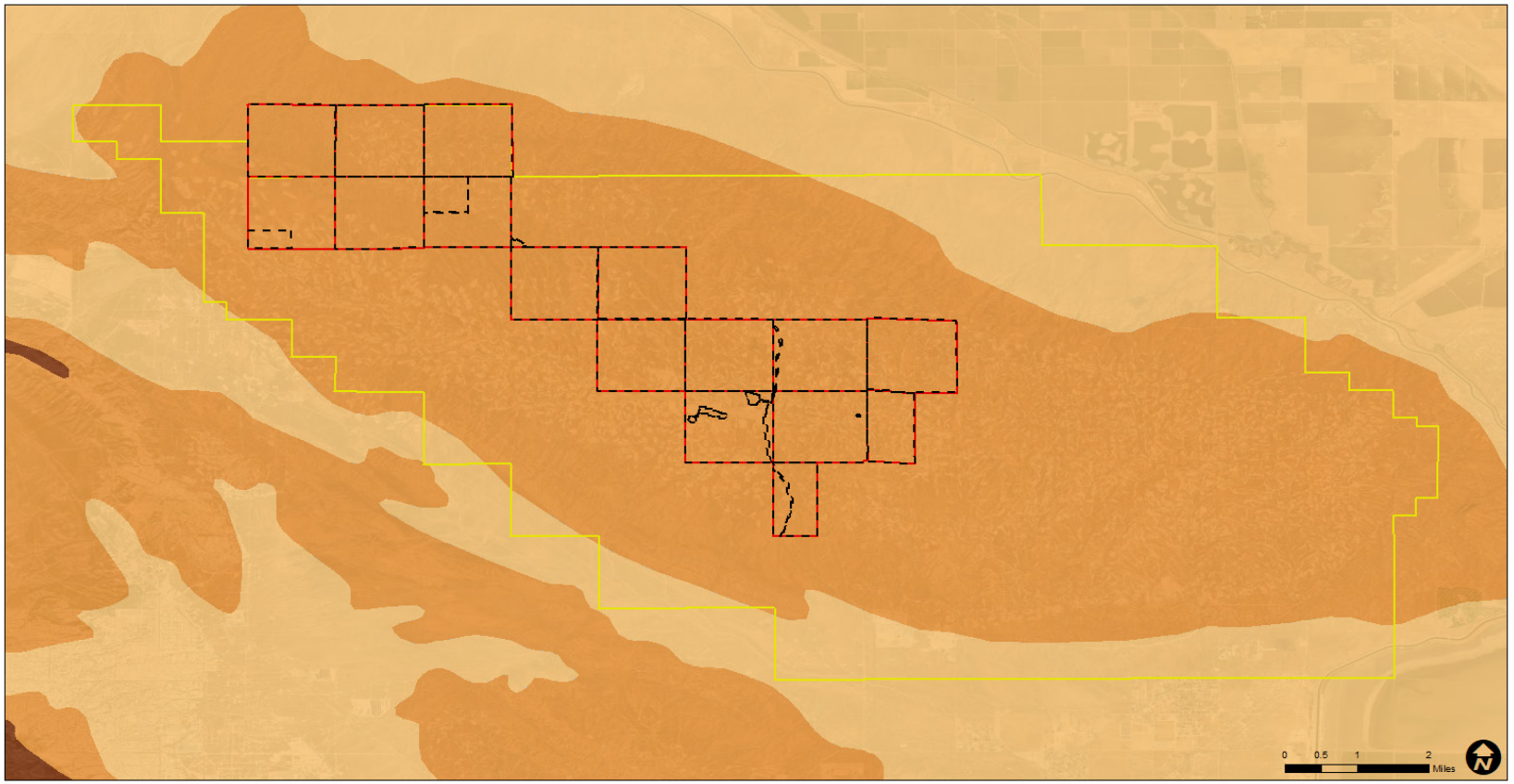

FIGURE 4.10-3: Geologic Map

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To support its oil field operations, California Resources Corporation (CRC) obtained Aquifer Exemptions for the Tulare Formation within the Elk Hills. Tulare Clay is a regional clay-rich layer up to 300 feet thick and extends from the Elk Hills to the Taft Sanitary Landfill and across the eastern Buena Vista Oil Field. Data from the Taft Sanitary Landfill shows that the Tulare Clay provides hydraulic isolation between aquifer intervals located immediately above and below the Tulare Clay layer. The Tulare Formation is confined above by Amnicola Claystone, a regionally extensive layer that separates the Upper and Lower Tulare Formations. The Amnicola Claystone is approximately 75 to 100 feet thick. Lateral confinement from underground sources of drinking water is primarily achieved through pressure containment. Injected fluids are expected to flow toward low-pressure areas and into the currently unsaturated zones in both the Upper and Lower Tulare Formations. Based on a thorough review of documents submitted by the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, and the State Water Resources Control Board (SWRCB), the EPA approved the Elk Hills Oil Field Phase I and Phase II Aquifer Exemptions in March 2018.

Surface Water and Quality

Elevation ranges throughout the project area. There are no surface water bodies (creeks, streams, or rivers) within the project area. However, there are surficial drainages throughout the project area that drain in the direction of the natural topography. Generally, local drainages that exist within the northwestern area of the project typically drain downslope to the north, and drainages within the more southeastern area of the project drain to the north down slopes facing north and south on slopes facing south toward the Buena Vista Lake area. Surface water flow is unlikely to exist within these local drainages unless during heavy precipitation events. As part of the requirements of the Clean Water Act (CWA), beneficial uses for surface and ground waters must be identified in the Central Valley Regional Water Quality Control Board's (RWQCB) Tulare Lake Basin Water Quality Control Plan (Basin Plan). Because the project area contains no surface water bodies, there are no surface water beneficial uses associated with the project area.

Groundwater Resources and Quality

Natural groundwater recharge within the Subbasin is primarily from stream seepage along the eastern Subbasin and the Kern River. Topography of the Elk Hills and the subsurface geology effectively impede any natural source of groundwater supply in the project area. There are multiple drainages across all sections that flow downslope typically to the north on the western portion. The eastern portion typically drains to the north on the northern sections and to the south on the southern sections.

Cross sections and well data presented in the Aquifer Exemption application and EPA approval letter confirm there is no appreciable quantity of groundwater in the project area. The project area is also within West Kern Water District's (WKWD) Western Watch Area, which is described as predominantly made up of barren land or oil fields. Depth to water in the spring of 2022 ranged between 122 and 148 feet and shows a gradient to the east–southeast. However, depth to groundwater is estimated at over 500 feet below ground surface in the project area. A groundwater assessment conducted in 1987 encountered no groundwater to a depth of 420 feet. In addition, a 1,000-foot soil boring was drilled in 1991 at the nearby and no groundwater was encountered.

Lastly, any groundwater that is encountered in this area is generally unusable because of high salinity levels.

Water quality in the area above the Tulare Clay is poor, which is consistent with aquifers associated with the Coast Range alluvium. Published water quality data indicate a range of about 4,000 to 6,800 milligrams per liter (mg/L) total dissolved solids (TDS) within the Elk Hills area. No water quality data are available from below the Tulare Formation, but water samples from wells located to the north, southwest, and southeast indicate an average of about 4,000 mg/L TDS. Samples from the Elk Hills indicate TDS in the Upper Tulare increases with depth. Since groundwater is not of sufficient supply or quality in the Elk Hills, fresh water supplies are available from WKWD or the Kern-Delta Water District with existing infrastructure to deliver water to customers.

Oil and Gas Production

The project area produces petroleum. Impacts to WKWD's groundwater supply by these operations, both actual and potential, are continuously monitored and evaluated. To date, no significant threat to groundwater quality has occurred because of local oil and gas operations. Produced water in western Kern County is typically managed by either recycling it for enhanced oil recovery operations, such as steam or cyclic steam flooding, or by permitted disposal under the regulatory oversight of the California Department of Oil and Gas. A significant percentage of the oil field-produced water in the project area is either recycled into the same geologic zones from which it was produced or is sequestered in deeper zones that are isolated from sources of drinking water. This water is supplemented by water purchased from WKWD, which indicates that very little water is disposed of, since purchasing fresh water is more expensive than recycling water.

Soil Types and 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 (such as concrete or asphalt) expose soils to precipitation and surface runoff and can accelerate surface soil erosion. The process may result in loss of topsoil and creation of erosional features including rills and gullies. Erosion potential is determined by four principal factors: the characteristics of the soil, the 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 erosion can cause a loss of land or possibly increase 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 because of increased stormwater flows.

The project area soils consist of Elk Hills–Torriorthents Stratified and Eroded Complexes, well drained with 9 to 50 percent slopes; Elk Hills sandy loams, eroded, well drained with 9 to 50 percent slopes; and Kimberlina sandy loams, well drained with 5 to 9 percent slopes. In general, sandy soils with relatively low cohesion and soils located on steep topography have a higher potential for erosion. Therefore, the project area is susceptible to erosion by wind and water.

Floodplains

A Flood Insurance Rate Map (FIRM) is the official map 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 (Figure 4.10-3). FEMA designates flood zones using a series of letters; for example, Zone A indicates areas of the 100-year flood where base flood elevations are not known, Zone AE indicates areas where 100-year flood elevations have been calculated, and Zone X indicates areas that experience minimal flooding. The project area is located in two FIRM areas (FIRMs 06029C2200E and 06029C2225E). Both FIRM areas are designated as Zone X and are outside of the 0.2 percent annual chance floodplain.

Dam Failure, Seiche, and Tsunami

The USACE prepares flood inundation maps in the event of a dam failure, including the closest dam (the Lake Isabella dam east of Bakersfield). The Lake Isabella dam is outside of dam inundation areas as defined by the Kern County General Plan (KCGP) as it is located over 60 miles to the east of the project area and the flood waters would not reach the project area because of its distance and topography (Figure 4.10-4). A tsunami is a series of ocean waves generated by sudden displacements in the sea floor, landslides, or volcanic activity. A seiche is a standing wave in an oscillating body of water. The project area is located approximately 73 miles east of the Pacific Ocean and there are no enclosed bodies of water within the project area. Therefore, the risk for tsunami or seiche in the project area is very low.

4.10.3 Regulatory Setting

Federal

Clean Water Act (33 U.S.C. §1321 et seq.)

The CWA (33 United States Code [U.S.C.] Section 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA required states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain nonpoint source discharges to surface water. Those discharges are the regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). In California, NPDES permitting authority is delegated to, and administered by, the nine RWQCBs. The project site is within the Central Valley RWQCB. Projects that disturb one or more acres, including the proposed project, are required to obtain NPDES coverage under construction general permits.

Figure 4.10-3: Federal Emergency Management Agency Flood Insurance Rate Map

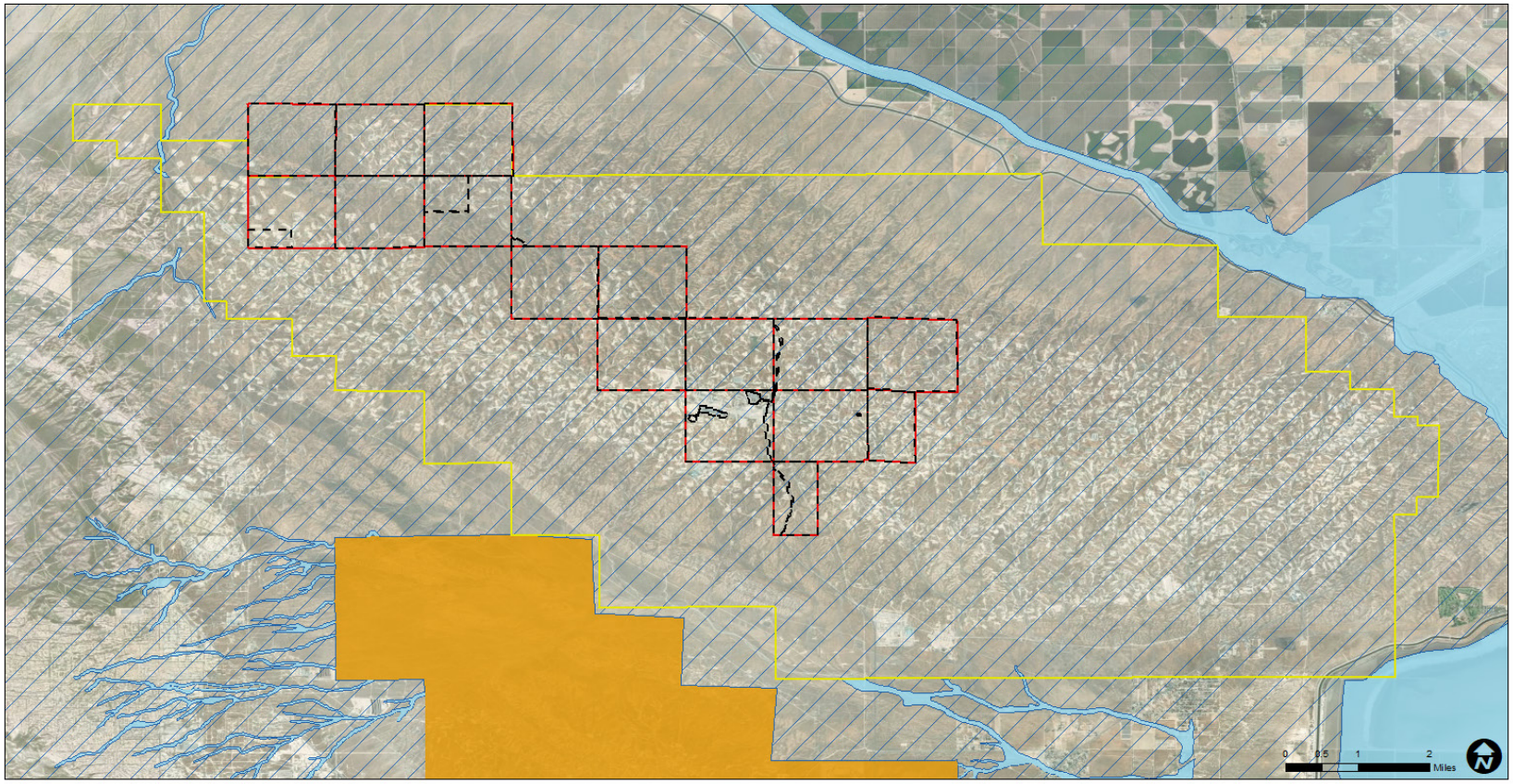

FIGURE 4.10-3: Federal Emergency Management Agency Flood Insurance Rate Map

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Figure 4.10-4: Lake Isabella Flood Area

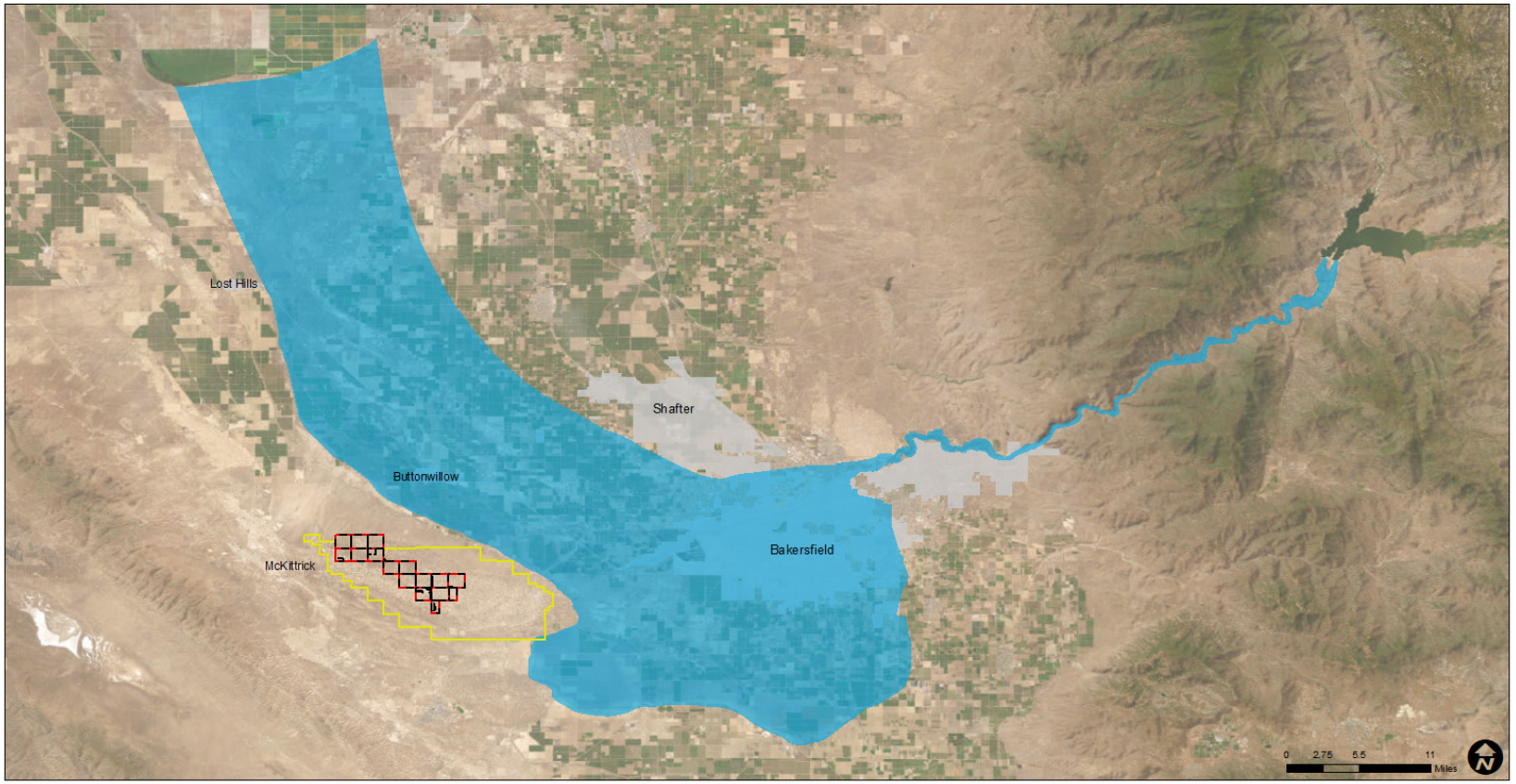
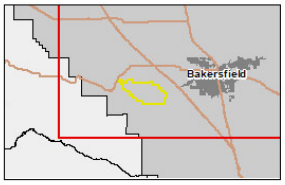


FIGURE 4.10-4: Lake Isabella Flood Area



CUP Boundary
Section Lines
Elk Hills Oilfield
Lake Isabella Flood Area*
*Areas to be flooded as a result of Lake Isabella Dam failure

Draft Environmental Impact Report
Carbon TerraVault I Project

Section 401, Water Quality Certification

Section 401 of the CWA requires that, prior to issuance of any federal permit or license, any activity (including river or stream crossing during road, pipeline, or transmission line construction) which may result in discharges into waters of the United States must be certified by the state, as administered by the RWQCB. This certification ensures that the proposed activity does not violate state and/or federal water quality standards.

Section 402, National Pollutant Discharge Elimination System

Section 402 of the CWA authorizes the State Water Resources Control Board (SWRCB) to issue a NPDES General Construction Storm Water Permit (Water Quality Order 2009-0009-DWQ), referred to as the "General Construction Permit." Construction activities can comply with and be covered under the General Construction Permit provided that they meet the following criteria:

- Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies best management practices (BMPs) that will prevent all construction pollutants from contacting stormwater and intend to keep all products of erosion from moving off-site into receiving waters.
- Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the United States.
- Perform inspections of all BMPs.

NPDES regulations are administered by the Central Valley RWQCB at the project site.

Section 303, Water Quality Standards and Implementation Plans

Section 303(d) of the CWA (33 U.S. Code 1250, et seq., at 1313(d)) requires states to identify "impaired" water bodies as those which do not meet water quality standards. States are required to compile this information in a list and submit the list to the U.S. EPA for review and approval. This list is known as the Section 303(d) list of impaired waters. As part of this listing process, states are required to prioritize waters and watersheds for future development of total maximum daily loads (TMDL) requirements. The SWRCB and RWQCBs have ongoing efforts to monitor and assess water quality, to prepare the Section 303(d) list, and to develop TMDL requirements.

The Safe Drinking Water Act of 1974 (42 U.S.C. §300f et seq.)

The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect all waters actually or potentially designed for drinking use, whether from aboveground or underground sources, including rivers, lakes, reservoirs, springs, and groundwater wells (EPA 2016). The SDWA authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water.

Oil and gas extraction typically produces large amounts of brine, which can contain toxic metals and radioactive substances. These brines can cause damage to the environment and public health if discharged into water or land. Deep underground injection of brines in formations isolated from underground sources of drinking water prevents soil and contamination. Injection became the preferred way to dispose of waste fluids when states began to implement rules preventing disposal of brine to surface water bodies and soils (EPA 2016).

The EPA has authority under the SDWA to regulate the subsurface injection of fluids below, into, and above an underground source of drinking water (USDW) and has established an Underground Injection Control (UIC) program by regulations promulgated under the Act (40 Code of Federal Regulations 144-147). A USDW is defined as any aquifer that (1) supplies a public water system or (2) contains enough groundwater to supply a public water system and either currently supplies drinking water for human consumption or contains less than 10,000 mg/L of TDS. An injection well is used to place fluid underground into porous geologic formations that may range from deep sandstone or limestone to a shallow soil layer. Injected fluids may include water, wastewater, brine (saltwater), or water mixed with chemicals (EPA 2016). The EPA ensures that underground injection wells do not endanger any current and future underground or surface sources of drinking water (EPA 2016). Injection wells are separated into six classes. Class I wells inject hazardous and non-hazardous wastes into deep, isolated rock formations that are separated from the lowest USDW by layers of impermeable clay and rock. Class II wells inject fluids associated with oil and natural gas production operations. Class III wells inject super-heated steam, water, or other fluids into formations to dissolve and extract minerals. Class IV wells inject hazardous or radioactive wastes into underground sources of drinking water and were banned by the EPA in 1984 (EPA 2016). Class IV wells may only operate as part of an EPA or state-authorized groundwater cleanup action. Class V injection wells include wastewater disposal wells used by the geothermal industry and shallow septic system and cesspool wells that drain liquid waste into the ground. Class VI wells are used to inject CO_2 into deep rock formations for long-term underground storage, also called geologic sequestration or "storage." Geologic storage refers to technologies to reduce CO_2 emissions to the atmosphere and mitigate climate change (EPA 2016).

National Flood Insurance Act

FEMA is responsible for managing the National Flood Insurance Program (NFIP), which makes federally backed flood insurance available for communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. The NFIP, established in 1968 under the National Flood Insurance Act, requires that participating communities adopt certain minimum floodplain management standards, including restrictions on new development in designated floodways, a requirement that new structures in the 100-year flood zone be elevated to or above the 100-year flood level (known as base flood elevation), and a requirement that subdivisions be designed to minimize exposure to flood hazards.

To facilitate identifying areas with flood potential, FEMA has developed Flood Insurance Rate Maps (FIRMs) that can be used for planning purposes, including floodplain management, flood insurance, and enforcement of mandatory flood insurance purchase requirements. Kern County is

a participating jurisdiction in the NFIP and, therefore, all new development must comply with the minimum requirements of the NFIP.

State

Department of Water Resources

The major responsibilities of the California DWR include preparing and updating the California Water Plan to guide development and management of the state's water resources; planning, designing, constructing, operating, and maintaining the State Water Resources Development System; regulating dams; providing flood protection; assisting in emergency management to safeguard life and property; educating the public; and serving local water needs by providing technical assistance. In addition, the DWR cooperates with local agencies on water resources investigations, supports watershed and river restoration programs, encourages water conservation, explores conjunctive use of ground and surface water, facilitates voluntary water transfers, and, when needed, operates a state drought water bank.

Porter-Cologne Water Quality Control Act (California Water Code §13000 et seq.)

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (Water Code Sections 13000 et seq.), passed in 1969, is the primary statute covering the quality of waters in California and requires protection of water quality by appropriate designing, sizing, and construction of erosion and sediment controls. The Porter-Cologne Act established the SWRCB and divided California into nine regions, each overseen by an RWQCB. The SWRCB is the primary State agency responsible for protecting the quality of the State's surface and groundwater supplies and has delegated primary implementation authority to the nine RWQCBs. The Porter-Cologne Act assigns responsibility for implementing the CWA Sections 401 through 402 and 303(d) to the SWRCB and the nine RWQCBs. The Porter-Cologne Act requires the development and periodic review of water quality control plans (basin plans) that designate beneficial uses of California's major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters, provide the technical basis for determining waste discharge requirements, identify enforcement actions, and evaluate clean water grant proposals. The basin plans are updated every three years. Compliance with basin plans is primarily achieved through implementation of the NPDES, which regulates waste discharges as previously discussed. The Porter-Cologne Water Quality Control Act requires that any person discharging waste or proposing to discharge waste within any region, other than to a community sewer system, which could affect the quality of the "waters of the State" file a report of waste discharge. Absent a potential effect on the quality of "waters of the State," no notification is required. However, the RWQCB encourages implementation of BMPs similar to those required for NPDES stormwater permits to protect the water quality objectives and beneficial uses of local surface waters.

Streambed Alteration Agreement (California Fish and Game Code)

California Fish and Game Code Section 1602 protects the natural flow, bed, channel, and bank of any river, stream, or lake designated by the California Department of Fish and Wildlife (CDFW) in which there is, at any time, any existing fish or wildlife resources, or benefit for the resources.

Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state, and requires any person, state or local governmental agency, or public utility to notify the CDFW before beginning any activity that will

- Substantially divert or obstruct the natural flow of any river, stream or lake;
- 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.

If it is determined during final engineering and design of a project that any project-related actions would have the potential to necessitate a streambed alteration agreement, such an agreement would be prepared and implemented prior to construction of the project, thus maintaining compliance with Section 1602 of the California Fish and Game Code. A streambed alteration agreement is required if the CDFW determines the activity could substantially adversely affect an existing fish and wildlife resource. The agreement includes measures to protect fish and wildlife resources while conducting the project. The CDFW must comply with California Environmental Quality Act (CEQA) before it may issue a final lake or streambed alteration agreement; therefore, the CDFW must wait for the lead agency to fully comply with CEQA before it may sign the draft lake or streambed alteration agreement, thereby making it final.

Sustainable Groundwater Management Act

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

The DWR has determined that processed water generated by oil and gas production is not groundwater. A comprehensive, detailed record of the groundwater in the Kern County basins that include both the project and cumulative projects and the Sustainable Groundwater Management Act plans are provided in Section 4.9, *Hydrology and Water Quality* of the Kern County Oil and Gas Supplemental Recirculated Environmental Impact Report (SREIR) (2020/2021).

The WKWD GSA was created June 28, 2016, when WKWD's Board of Directors adopted Resolution 16.03, electing to become a GSA in the Subbasin and included the WKWD service area. The WKWD is a member of the Kern Groundwater Authority (KGA) and has a Management Area Plan within the KGA's GSP for the project area. The WKWD GSA jurisdictional area is defined by the WKWD service boundary with some additional proximal parcels owned and operated by oil production companies and other private landowners (such as the project area). The WKWD GSA is located along the western edge of the Subbasin and comprises 299 square miles. The WKWD GSA formed two management areas, the North Project and South Project management areas, and three watch areas that include the Lake Watch Area, Little Santa Maria Valley Watch Area, and the Western Watch Area. The project area is located in the Western Watch Area because "the only known pumping in the area are considered de minimis; in general, yields of water in this area are unsuitable for domestic or industrial use" (WKWD 2022). Subsequently, no management or monitoring actions have been established in the Western Water Area.

The SGMA allows for multiple GSPs implemented by multiple GSAs and coordinated pursuant to a single coordination agreement that covers the entire basin to be an acceptable planning scenario (Water Code § 10727). In the San Joaquin Valley Kern County Subbasin ("Subbasin"), six GSPs were prepared by 17 GSAs for the various management areas established in the Subbasin pursuant to the coordination agreement and submitted to the California DWR for review. Collectively, the six GSPs and the coordination agreement are referred to as the Plan for the Subbasin. Individually, the GSPs include the following:

- Kern Groundwater Authority Groundwater Sustainability Plan–Amended July 2022, prepared by the KGA GSA, Semitropic Water Storage District GSA, Cawelo Water District GSA, City of McFarland GSA, Pioneer GSA, WKWD GSA, and Westside District Water Authority GSA
- Amended Kern River Groundwater Sustainability Plan, July 2022 , prepared by the Kern River GSA and Greenfield County Water District GSA
- Buena Vista Water Storage District GSA Groundwater Sustainability Plan, July 2022, prepared by the Buena Vista Water Storage District GSA
- Olcese Groundwater Sustainability Agency Groundwater Sustainability Plan, July 2022, prepared by the Olcese Water District GSA
- Henry Miller Water District Groundwater Sustainability Plan, July 2022, prepared by the Henry Miller Water District GSA

- South of Kern River Groundwater Sustainability Plan, July 2022, prepared by the Arvin GSA, Tejon-Castac Water District GSA
- Wheeler Ridge-Maricopa GSA

On March 2, 2023, the DWR deemed the six GSPs inadequate for the following deficiencies:

- Deficiency 1 involved how the Plan for the Subbasin established and justified undesirable results that represent effects caused by groundwater conditions occurring throughout the Subbasin.
- Deficiency 2 involved the establishment of minimum thresholds for the chronic lowering of groundwater levels.
- Deficiency 3 involved the establishment of sustainable management criteria for land subsidence.

These findings are based on all uses of groundwater in the region and not specific to oil and gas production.

Under the SGMA, the Groundwater Authorities are required to begin implementation of the plans, although found inadequate, while working to amend the plans and address the deficiencies.

Senate Bill 4 (Well Stimulation Treatment)

Section 1421(d) of the federal SDWA excludes "the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities" from regulation under the UIC program. Effective January 1, 2014, California adopted several new and amended provisions of the Public Resources Code and Water Code to regulate any oil or gas well stimulation activity designed to enhance oil or gas production or recovery by increasing the permeability of the geologic formation that contains hydrocarbon deposits. Well stimulation activities covered by the new legislation include hydraulic fracturing and acid well stimulation treatments. The legislation, commonly referred to as Senate Bill (SB) 4, amended Sections 3213, 3215, 3236.5, and 3401 and added Article 3 to Chapter 1 of Division 3 of the Public Resources Code, and added Section 10783 to the Water Code. SB 4 requires that the California Geologic Energy Management Division (CalGEM) (1) promulgate emergency interim and adopt permanent regulations regulating well stimulation treatments by January, 2015, to take effect no later than July 1, 2015; (2) complete a statewide EIR on well stimulation treatments by July 2015; (3) complete an independent scientific study of well stimulation by January 2015; and (4) consult and reach formal agreements with other regulatory agencies to provide regulatory accountability for, and public transparency to, well stimulation treatments by January 2015. SB 4 also requires that the SWRCB develop model criteria for oil and gas-related groundwater monitoring by July 2015. The regulations, studies, and interagency agreements required by SB 4 are intended to regulate water quality and potential geological hazards that could be associated with well stimulation, such as earthquakes or ground instability resulting from bedrock fracturing or acidization. Geology and soils regulatory requirements associated with

SB 4 are described in further detail in Section 4.6, *Geology and Soils,* of the 2015 Final (FEIR) (SREIR Volume 3).

Since SB 4 was enacted, CalGEM has developed the online tracking tool WellStar for locating well stimulation notices and information required by the applicable regulations. According to CalGEM, the state's WST (Well Stimulation Treatment) regulations "increase operational transparency; reporting requirements, including disclosure of WST fluid chemicals; and neighbor notification with the opportunity for neighbors to seek baseline water quality testing. They require an extensive engineering review and well integrity evaluation for groundwater protection and seismic monitoring. This includes a stoppage for evaluation should any earthquake greater than magnitude 2.7 near a stimulation operation occur. The State Water Resources Control Board also must review all proposed projects to determine whether groundwater monitoring is required" (CalGEM 2023a). In November 2019, CalGEM requested that the Lawrence Livermore National Laboratory (LLNL) conduct a third-party scientific review of pending well stimulation permit applications to ensure the state's technical standards for public health, safety, and environmental protection are met prior to approval of each permit. The LLNL also evaluated the completeness of WST operators' application materials and CalGEM's engineering and geologic analyses. CalGEM states that the review is "taking place as an interim measure while a broader audit is completed of CalGEM's permitting process for well stimulation. That audit is being completed by the Department of Finance Office of Audits and Evaluation (OSAE) and will be completed and shared publicly. LLNL experts are continuing evaluation on a permit-by-permit basis and conducting a rigorous technical review to verify geological claims made by well operators in the application process. Permit by permit review will continue until the Department of Finance Audit is complete" (CalGEM 2023b).

The SB 4 regulations require that certain physical well inspections, documentation, and public notices and disclosures be completed prior to and after completing a well stimulation process. The proposed regulations define well stimulation to include "a treatment of a well designed to enhance oil and gas production or recovery by increasing the permeability of the formation. Well stimulation is a short-term and non-continual process for the purposes of opening and stimulating channels for the flow of hydrocarbons. Examples of well stimulation treatments include hydraulic fracturing, acid fracturing, and acid matrix stimulation" (14 California Code of Regulations [CCR] §1761(a)(1)(A)). This definition "does not include routine well cleanout work; routine well maintenance; routine treatment for the purpose of removal of formation damage due to drilling; bottom hole pressure surveys; routine activities that do not affect the integrity of the well or the formation; the removal of scale or precipitate from the perforations, casing, or tubing; a gravel pack treatment that does not exceed the formation fracture gradient; or a treatment that involves emplacing acid in a well and that uses a volume of fluid that is less than the Acid Volume Threshold for the operation and is below the formation fracture gradient" (14 CCR §1761(a)(1)(B)).

Each well operator must obtain a permit from CalGEM in advance of performing a well stimulation treatment and must submit an application that includes the following information: the identification and location of the well, the time period during which the well stimulation treatment is planned to occur, a water management plan, a list of the anticipated identity and concentration of the chemical constituents of the well stimulation treatment fluids the operator plans to use, modeling of the well stimulation treatment axial dimensional stimulation area and identification of plugged and

abandoned wells and geologic faults within the modeled treatment area,; indication that the operator is developing a groundwater monitoring plan meeting the criteria of the applicable RWQCB (operations cannot commence unless a plan has been approved), an estimate of treatment-generated waste materials that are not addressed in the water management plan, identification and contact information of the operator, the depth of the base of fresh water, the results of specified evaluation and modeling, and casing designs (14 CCR §§1783, 1783.1, 1784).

Once CalGEM deems an application complete, a well operator must hire an independent entity or person to provide notification to every tenant and owner of neighboring property within a specified distance from the wellhead and horizontal projection of the applicable well at least 30 days prior to commencing a well stimulation treatment. Notified property owners may request baseline and follow-up water quality testing of their domestic and/or agricultural well(s) at the operator's expense, and prior notice of any such testing must be provided to the applicable RWQCB to allow for the opportunity to observe the water sampling process. Well operators must also pressure test a well and meet certain integrity requirements prior to commencing a well stimulation treatment. An operator may conduct the stimulation activity identified in an approved application and notice within one year of CalGEM's approval (14 CCR §§1783.2-1783.3).

The regulations require that, prior to conducting well stimulation, an operator must perform a pressure test after all facilities that could be affected by a proposed well stimulate are in place (14 CCR §1784.1). In addition, a cement evaluation or remediation procedure must be performed to ensure that the cement outside of the well production casing meets applicable regulatory requirements and is sufficient to ensure the geologic and hydrologic isolation of the oil and gas formation during and following the well stimulation treatment (14 CCR §1784.2).

The regulations require the operator to monitor the surface injection pressure, slurry rate, proppant concentration, fluid rate, and pressure of each annulus of the well during a well stimulation treatment. The operator must terminate the well stimulation treatment, report the incident to CalGEM, and conduct diagnostics in event certain performance and pressure thresholds are exceeded. Notices of any termination must be provided to CalGEM and other state agencies, including the RWQCB (14 CCR §1785). Finally, the proposed regulations require operators to perform ongoing monitoring of a well after a stimulation treatment and to immediately inform CalGEM and the RWQCB, conduct diagnostics, and take all appropriate measures to prevent contamination of protected water or loss of hydrocarbon resources. Tracking of seismic activity during and after well stimulation treatment must be performed using the California Integrated Seismic Network and require evaluation if an earthquake larger than magnitude 2.7 occurs within the vicinity of a well stimulation treatment (14 CCR §1785.1). Materials used in well stimulation are subject to storage, handling, and reporting requirements (14 CCR §1786). Well monitoring must be performed after each well stimulation treatment is completed, including pressure data and diagnostic testing, to verify that the well has not been breached (17 CCR §1787).

Each well operator must disclose within 60 days after a well stimulation treatment is completed information regarding the source, volume, and composition and disposition of well stimulation fluids, including, but not limited to, hydraulic fracturing fluids, acid well stimulation fluids, and flowback fluids (14 CCR §1788). The disclosures are provided to CalGEM and must be available

online in a format that allows for searching and aggregating the information. A well stimulation treatment report must also be filed with CalGEM, including any information concerning stimulation treatments that differ from what was anticipated in the well stimulation treatment design submitted to CalGEM under Section 1784(b) and whether the actual location of the well stimulation treatment differs from what was indicated in the stimulation permit application. Effective December 11, 2020, the public can use WellSTAR to find information about well stimulation treatment permits, well stimulation disclosures, well maintenance data, well records, and UIC projects.

Local

Kern County General Plan

Construction and operation of the proposed project would be subject to policies and regulations contained within the general plans including the Kern County General Plan (KCGP), Kern County Zoning Ordinance, and the Kern County Code of Building Regulations, which include policies, goals, and implementation measures related to hydrology and water quality. The policies and implementation measures in the KCGP related to hydrology and water quality that are applicable to the project are provided in this section. The KCGP contains additional policies, goals, and implementation measures that are more general in nature and not specific to development, such as the project. These measures are not listed below, but as stated in Chapter 2, *Introduction*, all policies, goals, and implementation measures in the KCGP are incorporated by reference.

The project site is located within the KCGP area and, therefore, would be subject to applicable policies and measures of the KCGP. The Land Use, Conservation, Open Space Element, and the Safety Element of the KCGP include goals, policies, and implementation measures related to hydrology and water quality that apply to the project, described as follows.

Chapter 1. Land Use, Conservation, and Open Space Element

1.3. Physical and Environmental Constraints

Policies

Policy 1. Kern County will ensure that new developments will not be sited on land that is physically or environmentally constrained ((Map Code 2.1 (Seismic Hazard), Map Code 2.2 (Landslide), Map Code 2.3 (Shallow Groundwater), Map Code 2.5 (Flood Hazard), Map Codes from 2.6 – 2.9, Map Code 2.10 (Nearby Waste Facility), and Map Code 2.11 (Burn Dump Hazard)) to support such development unless appropriate studies establish that such development will not result in unmitigated significant impact.

Policy 8. Encourage the preservation of the floodplain's flow conveyance capacity, especially in floodways, to be open space/passive recreation areas throughout the County.

Policy 9. Construction of structures that impede water flow in a primary floodplain will be discouraged.

Policy 10. The County will allow lands which are within flood hazard areas, other than primary floodplains, to be developed in accordance with the General Plan and Floodplain Management Ordinance, if mitigation measures are incorporated so as to ensure that the proposed development will not be hazardous within the requirements of the Safety Element (Chapter 4) of this General Plan.

Policy 11. Protect and maintain watershed integrity within Kern County.

Implementation Measures

Implementation Measure H. Development within areas subject to flooding, as defined by the appropriate agency, will require necessary flood evaluations and studies.

Implementation Measure J. Compliance with the Floodplain Management Ordinance prior to grading or improvement of land for development or the construction, expansion, conversion or substantial improvements of a structure is required.

Implementation Measure N. Applicants for new discretionary development should consult with the appropriate Resource Conservation District and the California Regional Water Quality Control Board regarding soil disturbances issues.

1.4. Public Facilities and Services

Goals

Goal 9. Serve the needs of industries and Kern County residents in a manner that does not degrade the water supply and the environment and protect the public health and safety by avoiding surface and subsurface nuisances resulting from the disposal of hazardous wastes, irrespective of the geographic origin of the waste.

1.9. Resource

Policy 11. Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.

Implementation Measures

Implementation Measure C. The County Planning Department will seek review and comment from the County Public Works Department, Engineering and Survey Services Division on the implementation of the National Pollution Discharge Elimination System for all discretionary projects.

1.10. General Provisions

Implementation Measures

Implementation Measure E: All new discretionary development projects shall be subject to the Standards for Sewage, Water Supply and Preservation of Environmental Health Rules and Regulations administered by the County's Public Health Services Department. Those projects having percolation rates of less than five minutes per inch shall provide a preliminary soils study and site-specific documentation that characterize the quality of upper groundwater in the alternative septic systems would adversely impact groundwater quality. If the evaluation indicated that the uppermost groundwater at the proposed site already exceeds groundwater quality objectives of the Regional Water Quality Control Board or would if the alternative septic system is installed, the applicant would be required to supply sewage collection, treatment, and disposal facilities.

1.10.6. Surface Water and Groundwater

Policies

Policy 34. Ensure that water quality standards are met for existing users and future development.

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.

Policy 40. Encourage utilization of community water system rather than the reliance on individual wells.

Policy 41. Review development proposals to ensure adequate water is available to accommodate projected growth.

Policy 43. Drainage shall conform to the Kern County Development Standards and the Grading Ordinance.

Policy 44. Discretionary projects shall analyze watershed impacts and mitigate for construction-related and urban pollutants, as well as alterations of flow patterns and introduction of impervious surfaces as required by the California Environmental Quality Act (CEQA), to prevent the degradation of the watershed to the extent practical.

Implementation Measures

Implementation Measure Y. Promote efficient water use by utilizing measures such as:

i. Requiring water-conserving design and equipment in new construction.

ii. Encouraging water-conserving landscaping and irrigation methods.

iii. Encouraging the retrofitting of existing development with water-conserving devices.

4.5. Landslides, Subsidence, Seiche, and Liquefaction

Policies

Policy 3. Reduce potential for exposure of residential, commercial, and industrial development to hazards of landslide, land subsidence, liquefaction, and erosion.

Implementation Measures

Implementation Measure B. Require liquefaction investigations in all areas of high groundwater potential and appropriate foundation design to mitigate potential damage to buildings on sites with liquefaction potential.

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.

Kern County Code of Building Regulations

Kern County Grading Ordinance (17.28)

Chapter 17.28 Kern County Grading Code. Requirements of the Kern County Grading Code will be implemented. A grading permit will be obtained prior to commencement of construction activities. Of particular note with respect to hydrology and water quality is Section 17.28.140, Erosion Control, which addresses the following:

Slopes. The faces of cut and fill slopes shall be prepared and maintained to control against erosion. This control may consist of effective planting. The protection for the slopes shall be installed as soon as practicable and prior to calling for final approval. Where cut slopes are not subject to erosion due to the erosion-resistant character of the materials, such protection may be omitted.

Other Devices. Where necessary, check dams, cribbing, riprap, or other devices or methods shall be employed to control erosion and provide safety.

Temporary Devices. Temporary drainage and erosion control shall be provided as needed at the end of each work day during grading operations, such that existing drainage channels would not be blocked. Dust control shall be applied to all graded areas and materials and shall consist of applying water or another approved dust palliative for the alleviation or prevention of dust nuisance. Deposition of rocks, earth materials, or debris onto adjacent property, public roads or drainage channels shall not be allowed.

Floodplain Management

Kern County has adopted a Floodplain Management Ordinance (Chapter 17.48 of the Building and Construction Code) that applies to "any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations, or storage of equipment or materials." The purposes of the

ordinance include the promotion of "public health, safety, and general welfare, and to minimize public and private losses due to flood conditions" and compliance "with the requirements of the NFIP Regulations." Among other implementation measures, the ordinance (1) restricts or prohibits certain uses that are susceptible to flood damage or increase erosion and flood heights or velocities; (2) requires that uses vulnerable to floods be protected against flood damage at the time of initial construction; (3) controls the alteration of natural floodplains, stream channels, and natural protective barriers that accommodate or channel flood waters; (4) controls filling, grading, dredging, and other development which may increase flood damage; and (5) prevents or regulated the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas.

Kern County Development Standards

The Kern County Development Standards apply to all developments within Kern County that are outside of incorporated cities. These standards establish minimum design and construction requirements that will result in improvements that are economical to maintain and will adequately serve the general public. The requirements set forth in these standards are considered minimum design standards and will require the approval of the entity that will maintain the facilities to be constructed prior to approval by the County.

Kern County Water Quality Control Plan

Each of the nine RWQCBs adopts a Water Quality Control Plan that recognizes and reflects regional differences in existing water quality, the beneficial uses of the region's groundwater and surface waters, and local water quality conditions and problems. Water quality problems in the regions are listed in these plans, along with the causes if they are known. Each RWQCB is to set water quality objectives that will ensure the reasonable protection of beneficial uses and the prevention of nuisance, with the understanding that water quality can be changed somewhat without unreasonably affecting beneficial uses.

The Kern County Engineering and Survey Services Department requires the completion of an NPDES applicability form for all construction projects disturbing one or more acre within Kern County. This form requires the project proponent to provide background information on construction activities. Project proponents must apply for the permit under one of the following four conditions:

1) All storm water is retained onsite and no storm water runoff, sediment, or pollutants from onsite construction activity can discharge directly or indirectly offsite or to a river, lake, stream, municipal storm drain, or offsite drainage facilities.

2) All storm water runoff is not retained on site but does not discharge to a water of the United States (i.e., drains to a terminal drainage facility). Therefore, a SWPPP has been developed and BMPs must be implemented.

3) All storm water runoff is not retained on site, and the discharge is to a water of the United States. Therefore, a Notice of Intent (NOI) must be filed with the State Regional Water Resources Control Board prior to issuance of the building permit. Also, a SWPPP has been developed and BMPs must be implemented.

4) Construction activity is between 1 to 5 acres and an Erosivity Waiver was granted by the SWRCB. BMPs must be implemented.

Kern County – Applicability of NPDES Program for a Project Disturbing 1 Acre or Greater

As closed systems that never contact the ocean or other waters of the United States, many of the waters within Kern County are technically not subject to protective regulations under the federal NPDES Program. The Kern County Public Works Department requires the completion of an NPDES applicability form for projects with construction activities disturbing one or more acres and requires the project proponent to provide information about construction activities and to identify whether storm water runoff has the potential of discharging into waters of the United States, waters of the state, or a terminal drainage facility. The purpose of the form is to identify which water quality protection measure requirements apply to different projects (if any). Should stormwater runoff be contained on-site and not discharge into any waters, no special actions are required. Should stormwater runoff discharge into waters of the United States, compliance with the SWRCB Construction General Permit SWPPP requirements is required. Should stormwater runoff not be contained on-site and drains to waters of the state or a terminal drainage facility, the project proponent would be required to develop a SWPPP and BMPs.

4.10.4 Impacts and Mitigation Measures

Methodology

This section analyzes impacts on hydrology and water quality from the implementation of the project based on changes to the environmental setting as described above. The project's potential impacts to hydrology and water quality have been evaluated using the Hydrology Report and the Water Supply Assessment (Appendix G-2) of this EIR. Additionally, a variety of resources, including multiple online sources, published documents, the Kern County General Plan, and professional judgment, impacts were analyzed according to CEQA significance criteria described below.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist identify the following criteria, as established in Appendix G of the CEQA Guidelines, to determine if a project could potentially have a significant adverse effect on hydrology and water quality.

A project could have a have a significant impact on hydrology and water quality if it would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner which would:
  - (i) result in a substantial erosion or siltation on- or off-site;
  - (ii) substantially increase the rate of amount of surface runoff in a manner which would result in flooding on- or off-site;
  - (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
  - (iv) impede or redirect flood flows.
- Result in a flood hazard, tsunami, seiche zones, risk release of pollutants due to project inundation.
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Project Impacts

Impact 4.10-1: Violate Water Quality Standards or Waste Discharge Requirements, or Otherwise Substantially Degrade Surface or Groundwater Quality

Water quality standards and waste discharge requirements could be violated if the project releases polluted discharges into receiving waters without a permit. Polluted discharges can generate polluted stormwater runoff (i.e., water generated during storm events) or dry weather runoff (i.e., water generated during activities such as dust control). Polluted discharge can consist of sediment from erosion, pollutants from herbicides or pesticides applied to agricultural lands or vegetation, or pollutants from construction equipment, such as oil drippings or accidental spills of petroleum hydrocarbons.

Construction

Project construction would include clearing, mowing, excavation, and grading portions of the project site. Due to the relatively flat terrain of the site, it is anticipated that grading would be limited throughout the project site to achieve an elevation for final grading. The roadway extensions

are anticipated to be constructed by clearing, leveling, and surfaced with decomposed granite/gravel and/or compacted road base. The use of heavy equipment such as earthmovers, scrapers, excavators, dozers, water trucks, paddlewheels, haul vehicles, and graders would likely be used in site preparation. In addition, on-site trenching would be required. These activities have the potential to affect current drainage patterns and erosion on the project site, and soils could be become exposed to high winds or heavy precipitation causing a substantial increase in sedimentation in storm water runoff; however, designing the site grading and access roads in compliance with County of Kern (County) standards would prevent substantial alterations to drainage patterns and erosion within the project site.

Potential impacts on water quality from erosion and sedimentation are expected to be localized and temporary during construction. Stormwater runoff from the project site would not discharge to waters of the United States since the project area is within a watershed that is not hydrologically connected to a navigable waterway. However, because the proposed project would disturb more than 1 acre of ground disturbance the proposed project would be required by the NPDES Construction General Permit to implement a SWPPP during construction. Per Mitigation Measure (MM) 4.10-1 and MM 4.10-2, the SWPPP would include BMPs designed to prevent the occurrence of soil erosion and discharge of other construction-related pollutants that could contaminate water quality and would be applicable to all areas of the project. In addition, prior to the commencement of construction activities, the project proponent would be required to adhere to the requirements of the Kern County Grading Code. This includes implementation of various measures designed to prevent erosion and control drainage on-site, thereby further preventing the potential sedimentation and subsequent degradation of stormwater.

During project construction, any activity that results in the accidental release of hazardous or potentially hazardous materials could result in water quality degradation. Materials that could contribute to this impact include, but are not limited to, petroleum products (e.g., gasoline, diesel, and motor oil), automotive fluids (e.g., antifreeze, lubricant oils, transmission fluid, and hydraulic fluids), cement slurry, and other fluids utilized by construction vehicles and equipment. Motorized equipment could leak hazardous materials due to inadequate or improper maintenance, unnoticed or unrepaired damage, improper refueling, or operator error. The mobilization of sediment or inadvertent spills or leaks of such pollutants could affect the quality of runoff water from construction activities.

As noted in Section 4.9, *Hazards and Hazardous Materials*, of this EIR, MM 4.9-1 would require the project proponent to provide a Worker Environmental Awareness Program that would describe proper handling, storage, transport, and disposal techniques; describe methods to be used to avoid spills and minimize impacts in the event of a spill; describe procedures for handling and disposing of unanticipated hazardous materials encountered during construction; and establish public and agency notification procedures for spills and other emergencies, including fires. MM 4.10-1 and MM 4.10-2 identify additional guidance for the safe handling and use of these materials, which is guided by the NPDES Construction General Permit and SWPPP. The measures identify protocols regarding the handling of these types of materials should a spill or release occur. Therefore, with implementation of MM 4.10-1, MM 4.10-2, and MM 4.9-1, impacts to water quality would be less than significant during construction.

Operation

The project includes operation of a carbon capture and storage field, associated injection wells, and related improvements for storage of CO_2. The majority of the site would be occupied by capture, compression, and pumping facilities and associated infrastructure, and would not substantially alter the drainage patterns of the site. Due to the largely flat contours of the project site, runoff from rainwater would drain naturally and most water would infiltrate the ground surface. While some rainfall from the margins of the site could flow off-site via sheet flow, effects would be minimal and the potential for substantial erosion that could occur under concentrated runoff condition is considered low. Nonetheless, where potential for channel erosions exists, BMPs would be implemented to prevent surface flows from becoming concentrated.

To further minimize the potential for degradation of water quality, the project site's engineering and design plans would comply with the most recent requirements of the Kern County Code of Building Regulations. This includes provisions to minimize runoff and erosion leading to potential degradation of downstream receiving waters or other off-site areas. Prior to the commencement of construction activities, the applicant would be required to prepare and submit drainage plans to the Kern County Engineering and Survey Services Department. This would include post-construction structural and nonstructural BMPs.

Upon completion of all construction activities, the project proponent would ensure that the facility would be properly operated and maintained. Routine maintenance would be completed annually and may include, but is not limited to, checking parts for wear and replacing as required. Operation and maintenance personnel would also inspect access roads, crane pads, and trenched areas regularly and maintain them to ensure minimal erosion. Therefore, the project would require limited use of certain hazardous materials for routine operations and maintenance. Accidental release of such materials could result in water quality degradation should the materials become entrained in stormwater. This would result in a potentially significant impact on water quality. However, as described above, implementation of MM 4.9-1 (see Section 4.9, *Hazards and Hazardous Materials*) would provide a Worker Environmental Awareness Program that would ensure safe handling of hazardous materials on-site and provide the means for prompt cleanup in the event of an accidental hazardous material release.

The project would take local industrial sources of CO_2 that are transported via a facility pipeline network to the dedicated injection wells that are constructed through geologically confined reservoirs for storage in perpetuity. The Elk Hills oilfield area has been identified as a location suitable for such storage due to the faults and folds that serve as restrictive structures combined with the thick confining layers of the Tulare Formation and Amnicola Clay that form geologic barriers to usable groundwater sources.

Geotechnical studies and modeling for the project area (Appendix E-1) demonstrates lateral confinement from underground sources of drinking water is primarily achieved through pressure containment. Injected fluids are expected to flow towards low-pressure areas and into the currently unsaturated zones in both the Upper and Lower Tulare Formations. Furthermore, there are no

records of water supply wells within the proposed storage areas. Therefore, there is no groundwater used as drinking water, and no complete pathway for exposure to contaminated groundwater.

Per MM 4.10-4 and MM 4.10-5, the UIC program would prevent discharge into any underground source of current or future beneficial use groundwater. Injection of CO_2 into the ground via injection well would not mix with or contaminate groundwater. Therefore, operation of the project would not violate water quality standards, waste discharge requirements, or degrade surface or water quality in the area.

Conformance to these measures and implementation of MM 4.9- 1, MM 4.10-1, MM 4.10-2, MM 4.10-3, MM 4.10-4, and MM 4.10-5 would minimize long-term impacts on drainage patterns and water quality across the project site that could result in substantial erosion and siltation on- or off-site. Therefore, impacts would be less than significant.

Mitigation Measures

Implementation of MM 4.9-1 would be required (see Section 4.9, *Hazards and Hazardous Materials*, for full mitigation measure text). Additionally, MM 4.10-1 through MM 4.10-5 would be required.

MM 4.10-1 The Owner/operator shall comply with all applicable federal, state, regional and local agency water quality protection laws and regulations, and commonly utilized industry standards, including (where applicable) obtaining coverage under the stormwater construction general permit and industrial general permit issued by the State Water Resources Control Board and complying with industry stormwater management standards for construction and operational activities. The Owner/operator shall obtain Class VI UIC permit(s) for all new or converted CO_2 wells from the U.S. EPA UIC program and fully comply with all requirements.

MM 4.10-2 A. The project shall comply with the following:

1. In areas subject to National Pollutant Discharge Elimination System stormwater permitting requirements, project Owner/operators shall file a Notice of Intent to the State Water Resources Control Board to comply with the statewide General Permit for Discharges of Stormwater Associated with Construction Activities (Construction General Permit State Water Resources Quality Control Board Order No 2009-009-DWO) (as such permit may be amended, revised or superseded) prior to undertaking all ground-disturbing activities greater than one acre and shall prepare and implement a Stormwater Pollution Prevention Plan for construction activities on the Project site in accordance with the Construction General Permit. For facilities requiring coverage under the Construction General Permit, the site-specific Stormwater Pollution Prevention Plan shall include measures to achieve the following objectives: (1) all pollutants and their sources, including sources of

sediment associated with construction activity are controlled; (2) all non-stormwater discharges are identified and either eliminated, controlled and treated, (3) site Best Management Practices are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity and (4) stabilization Best Management Practices to reduce or eliminate pollutants after construction are completed. The Stormwater Pollution Prevention Plan shall be prepared by a qualified preparer and shall include the minimum Best Management Practices required for the identified risk level. The Stormwater Pollution Prevention Plan shall include a construction site monitoring program that identified requirements for dry weather visual observations of pollutants at all discharge locations and, as applicable, depending on the project risk level, sampling of site effluent and receiving waters. A qualified Stormwater Pollution Prevention Plan practitioner shall be responsible for implementing and all monitoring for the Best Management Practices as well as all inspection, maintenance and repair activities at the project site. If applicable, each project shall also implement and fully comply with the Industrial Storm Water Permit (Order No 97-03-DWO) and Kern County Municipal Stormwater Permit (Order No 5-01-120). All plans under these requirements shall be submitted to Kern County Public Works for review and approval.

Any change to this State Water Regional Control Board determination will require full compliance with National Pollutant Discharge Elimination System requirements.

2. Any operator not subject to National Pollutant Discharge Elimination System stormwater permitting requirements shall implement Best Management Practices during construction and operation. All selected practices shall be shown on a drainage implementation plan and self-certified as complete by a licensed professional qualified in drainage and flood control issues. The plan shall be submitted to the Kern County Planning and Natural Resources Department. The following Best Management Practices shall be implemented and shown on the drainage implementation plan:

    a. Utilizing established facilities design and construction standards as applicable (e.g., American Society for the Testing and Materials (ASTM) American Petroleum Institute (API).

    b. Implementing good housekeeping and maintenance practices:

        i. Preventing trash, waste materials and equipment from construction storm water.

ii. Maintaining wellheads, compressors, tanks and pipelines in good condition without leaks or spills.

iii. Designing and maintaining graded pads to not actively erode and discharge sediment

iv. Maintaining vehicles in good working order

v. Providing secondary containment for all aboveground storage tanks and maintaining such containment features in good operating condition

c. Implementing spill prevention and response measures:

i. Utilizing preventative operating practices such as tank level monitoring, safe chemical handling and conducting regular inspections.

ii. Developing and maintaining a spill response plan

iii. Conducting spill response training for employees and have a process to ensure contractors have the necessary training

iv. Maintaining spill response equipment on-site.

d. Implementing material storage and management practices:

i. Preventing unauthorized access

ii. Utilizing "run-on" and "run-off" control berms and swales

iii. Stabilizing exposed slopes through vegetation and other standard slope stability methods.

B. The CCS project shall comply with all applicable state ,federal and local stormwater management laws. Prior to construction or grading, the owner/operator shall submit a drainage and flood study plan to the Kern County Public Works Floodplain division for review and approval.

The Owner/operator shall prepare a drainage plan that complies with requirements to address runoff and the potential for impeding or redirecting 100-year flood flows. The drainage plan shall be prepared in accordance with the Kern County Grading Ordinance, Kern County Green Code, Development Standards and approved by the Kern County Department of Public Works, Floodplain Management Section. The drainage plan shall specify best management practices to prevent all construction pollutants from contacting stormwater, with the intent of keeping sedimentation or any other pollutants from moving offsite and into receiving waters. The requirements of the Plan shall be incorporated into design specifications. Recommended best management practices for the

construction phase must be shown on a drainage plan, and shall include the following:

a. Erosion Control -

1. Scheduling of construction activities to avoid rain events.
2. Implementing runoff erosion control methods consistent with the drainage plan when vegetation has been removed.

b. Sediment Control -

1. Secure stockpiling of soil.
2. Installation of a stabilized construction entrance/exit and stabilization of disturbed areas.

c. Non-stormwater Control -

1. Fueling and maintenance of equipment and vehicles shall be managed so as to prevent contamination of runoff from the site.
2. Concrete handling techniques shall be consistent with the drainage plan and shall comply with Mitigation Measure 4.14-15 (m).

d. Waste and Material Management -

1. Managing construction materials, consistent with the drainage plan and designating construction staging areas in or around the Project site.
2. Stockpiling and disposing of demolition debris, concrete, and soil in compliance with regulatory requirements and consistent with the drainage plan.
3. Prompt removal and disposal of litter.
4. Disposal of demolition debris, concrete and soil in compliance with regulatory requirements for solid waste.
5. Provide and maintain secondary containment to prevent or eliminate pollutants from moving offsite and into receiving waters in compliance with Mitigation Measure 4.8-3.

e. Post-Construction Stabilization -

1. Ensuring the stabilization of all disturbed soils per revegetation or application of a soil binder.

C. If construction activities will alter federal jurisdictional waters, project Owner/operator s shall comply with the federal Clean Water Act Section 404 and Section 401 permitting and certification requirements. If construction

activities will alter state waters, project Owner/operator s shall comply with California Department of Fish and Wildlife Streambed Alteration requirements.

MM 4.10-3 All drilling operations must either use a closed loop system to avoid discharges of drilling muds and fluids, or obtain coverage under the State Water Resources Control Board low threat discharge General Order (Waste Discharge Requirements General Order 2003-0003-DWQ), obtain individual Waste Discharge Requirements issued by the Central Valley Regional Water Quality Control Board for the unit, or obtain coverage under a general order issued by the Central Valley Regional Water Quality Control Board applicable to drilling ponds. Any surface ponds or sumps must be cleared of fluids and muds in accordance with the State Water Resources Control Board general order, applicable Water Discharge Requirements and Division of Oil Gas and Geothermal Resources regulations. Compliance with the State Water Resources Control Board or Central Valley Regional Water Quality Control Board low-threat discharge orders or Water Discharge Requirements, if closed-loop systems are not used, and applicable laws, regulations and standards will reduce potential surface water quality impacts from contact with drilling muds or fluids during drilling and construction to less than significant levels.

MM 4.10-4 The Owner/operator shall not conduct any Class VI injection activity regulated by the UIC program that discharge into any underground source of current or future beneficial use groundwater, including drinking water. The Owner/operator must demonstrate compliance with U.S. EPA Class VI UIC permit conditions.

MM 4.10-5 The Owner/operator shall not discharge produced water into any surface disposal facility unless the facility has received the Waste Discharge Requirements from the Central Valley Regional Water Quality Control Board, or the need for Water Discharge Requirements has been waived by the Central Valley Regional Water Quality Control Board. As required by the SB 4 regulations, well stimulation treatment fluids and produced fluids from wells that have been stimulated cannot be stored, discharged, or disposed into surface ponds or pits.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.10-2: Substantially Decrease Groundwater Supplies or Interfere Substantially with Groundwater Recharge Such That the Project May Impede Sustainable Groundwater Management of the Basin

The project site is in the DWR-designated groundwater Kern County Subbasin. Groundwater sustainability in the subbasin is overseen by the KGA, which has adopted the Kern Groundwater Authority Groundwater Sustainability Plan. The proposed project would use water during construction and for operation of the project. Water for the project would be supplied by the WKWD from existing water allocations for Elk Hills and CRC, as described in detail in Section 4.19, *Utilities and Service Systems*. Water for both construction and operation would be imported by trucks and stored on-site in aboveground storage tanks, as needed. Project water demands would not substantially deplete the supplies of the local water district (including groundwater).

While the project would result the conversion of portions of the site to impervious surface areas (e.g., well pads, compression, and pumping stations), the project would not substantially impede recharge, thereby reducing groundwater volumes, and impact sustainable groundwater management within the basin either during construction or during operation.

As described above in Subsection 4.10.2, *Environmental Setting*, depth to groundwater within the vicinity of the project site is greater than 50 feet below ground surface. It is reasonable to assume some groundwater infiltration at the project site during precipitation events because the majority of the project site is currently pervious and consists of open ground. However, the project site is not specifically designated as and does not specifically operate as a groundwater recharge location.

Construction

The project would require water for dust suppression, fire protection, and pipeline hydrotesting. Water usage during construction, primarily for dust suppression purposes, is not anticipated to exceed 75 acre-feet over the 18-month construction phase. The water would be trucked and stored on-site and would not substantially decrease groundwater supplies within the Subbasin, as detailed in Section 4.19, *Utilities and Service Systems*.

Construction would not prevent or inhibit any incidental groundwater recharge that currently occurs on-site from precipitation. During construction, the project site would generally remain pervious and would allow any current infiltration that occurs to continue. During installation of the project components, most rainfall would disperse across their panel surface and fall to the ground surface. This would facilitate infiltration and subsequent groundwater recharge.

The project would not impede sustainable groundwater management of the basin.

While the project would result the conversion of portions of the site impervious area, most of the ground surface would remain permeable and enable infiltration. Thus, construction of the project would not substantially reduce groundwater volumes or impede recharge and impact sustainable groundwater management within the basin.

Thus, due to the minimal amount of groundwater needed for construction activities, and the temporary, short-term nature of groundwater extraction required, construction of the project would not be considered water intensive. Thus, the project also would not impede sustainable groundwater management of the basin and impacts would be less than significant.

Operation

The project would include the addition of new impervious surfaces due to the implementation of concrete foundations, resurfacing (concrete) of existing dirt roads, development of new access roads, implementation of the proposed CO_2 compression and pumping facility, which includes the control room and parking area, injection wells, and underground pipelines. As discussed above, most water falling on the site would runoff and fall to the ground surface and infiltrate.

The proposed facilities would not have the scale or massing to interfere with groundwater recharge in the area. Therefore, implementation of impervious surfaces and facilities would not impede groundwater management of the Subbasin.

Project operation would not rely on locally sourced groundwater wells, as all water would be trucked to the site from the WKWD.

Implementation of the project does not propose uses that would require removal of groundwater from the project site, such as extraction and recovery wells. Therefore, it would not decrease groundwater supplies or impede sustainable management of the Subbasin. As described in Section 4.19, *Utilities and Service Systems*, the Kern County subbasin, as a whole, has an overdraft of 324,326 acre-feet per year over the baseline conditions of which the KGA is approximately 239,346 acre-feet of the deficit. Should the project require water supplies in excess of the allotment from the District, impacts to water supplies would be considered potentially significant. In order to address this, MM 4.19-1 would be implemented, ensuring that any groundwater or reclaimed water used is accounted for and regulated. Therefore, with mitigation, the impacts would be less than significant for the project.

Mitigation Measures

Implementation of MM 4.19-1 would be required (see Section 4.19, *Utilities and Service Systems*).

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.10-3: 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 That Would:

(i) Result in a Substantial Erosion or Siltation On or Off Site.

The project is located on relatively flat terrain, with the project site situated on varying slopes. There are no surface water bodies (creeks, streams, or rivers) within the project area. However, there are surficial drainages throughout the project area that drain in the direction of the natural topography. Generally, local drainages that exist within the northwestern area of the project typically drain downslope to the north, while drainages within the more southeastern area of the project drain to the north down slopes facing north, and south on slopes facing south, towards the Buena Vista Lake area. Surface water flow is unlikely to exist within these local drainages unless during heavy precipitation events.

Construction

Grading for the project and installation of project facilities would result in minimal changes to the existing on-site drainage patterns and flowpaths and minimal alteration of surface topography via ground disturbance and project facilities. Although there are minimal changes to water flows are anticipated, the project does have the potential to alter drainage patterns such that flooding could be exacerbated on-site during a rain event. If the site and drainage plan is not properly designed, this could cause localized flooding during major events within the project site, along the margins of the project area, or in off-site downstream drainage areas.

However, due to the relatively flat nature of the project site, grading is not anticipated to be substantial and would not substantially change the existing drainage patterns. The drainage patters during both construction and operation would be such that water received on-site during rain event and off-site flow that enters the site would continue to flow through the site much as it does currently.

Operation

The project site is relatively flat and would remain so post-construction and the operational-related impacts from erosion or siltation would be less than significant. The project's site engineering and design plans would be required to comply with the most recent requirements of the Kern County Code of Building Regulations. The design and plan review process would ensure that the final grading would conduct site drainage to facilities designed to control runoff.

Lastly, and as discussed above, the project would implement MM 4.10-1 and MM 4.10-2 to reduce long-term impacts on drainage patterns across the project site. Therefore, with mitigation, the impacts would be less than significant for the project.

Mitigation Measures

Implement MM 4.10-1 and MM 4.10-2, as described above.

Level of Significance After Mitigation

Impacts would be less than significant.

(ii) Substantially Increase the Rate of Amount of Surface Runoff in a Manner That Would Result in Flooding On or Off Site

The rate and amount of surface runoff is determined by multiple factors, including topography, the amount and intensity of precipitation, the amount of evaporation that occurs in the watershed, and the amount of precipitation and water that infiltrates to the groundwater. The project would not alter the amount or intensity of precipitation, nor would it require significant amounts of additional water to be imported to the project site. In addition, the project site is located in an area designated by FEMA as Zone X, which is defined as an area with minimal flood hazard.

Construction

Although excavation and grading would occur on portions of the project site, the project site is relatively flat and ground disturbance would not substantially alter the overall topography or flow regime of these areas or the project site. Some areas with vegetation would be removed, but would be revegetated and maintained in their existing condition to the greatest extent feasible. This would help facilitate groundwater infiltration minimize surface flow and reduce runoff. Water would be applied to the ground surface during the temporary construction phase, primarily for dust suppression and to reduce erosion from wind and vehicle disturbances. The water would be mechanically and precisely applied and would generally infiltrate or evaporate which would minimize the potential for uncontrolled runoff from this source.

Accordingly, grading would not substantially alter the existing contours of the site and there are no existing streams, rivers, or drainages that would be modified by construction activities. Thus, while runoff patterns and concentrations could be altered by grading activities, for the aforementioned reasons, such changes would be minimal and the rate or amount of surface runoff resulting from project construction activities would be similar to the existing condition. Thus, the rate or amount of surface runoff resulting from project construction activities would be similar to the existing condition and the potential for on-site or off-site flooding as a result of project construction is minimal. The potential effects would be further reduced through compliance with design specifications and BMPs required by the Kern County Grading Ordinance and the preparation of a SWPPP, included under MM 4.10-1 and MM 4.10-2.

Operation

Operation of the project would slightly alter the existing drainage pattern on-site. Although there are minimal changes to water flows are anticipated, the project does have the potential to alter drainage patterns such that flooding could be exacerbated on-site during a rain event. Additionally, as stated above, project facilities and infrastructure are not within the flood zone.

Lastly, as described above, under impact the project site is relatively flat and would remain so post-construction. The project would include a drainage plan that would further minimize the potential for increased flooding from implementation of the project.

Thus, through conformance with all requirements contained within the Kern County Grading Ordinance and implementation of MM 4.10-1 and MM 4.10-2, long-term effects on drainage patterns and the potential to result in flooding on- or off-site, would be less than significant.

Mitigation Measures

Implementation MM 4.10-1 and MM 4.10-2, as described above.

Level of Significance After Mitigation

Impacts would be less than significant.

(iii) Create or Contribute Runoff Water That Would Exceed the Capacity of Existing or Planned Stormwater Drainage Systems or Provide Substantial Additional Sources of Polluted Runoff

Construction

The project site is located in a remote, rural area with no existing or planned stormwater infrastructure. There are no existing stormwater drainage systems on the project site, and no stormwater drainage systems are proposed as part of the project. The project site is drained by sheet flow and any existing rainfall and irrigation runoff, as well as that which would be applied during construction would percolate into the ground with minimal potential for runoff. If water from rainfall events during construction is not properly controlled, however, it could result in runoff containing silt or soil from bare ground surfaces.

In addition, runoff could contain potentially hazardous materials including, but are not limited to, petroleum products (e.g., gasoline, diesel, and motor oil), automotive fluids (e.g., antifreeze, lubricant oils, transmission fluid, and hydraulic fluids), cement slurry, and other fluids utilized by construction vehicles and equipment if an accidental release of these materials were to occur during the construction phase.

To further reduce the potential for effects from erosion or other materials, the proposed project would be required to adhere to drainage plans approved by the Kern County Engineering, Surveying and Permit Services Department. The proposed project also would comply with all NPDES permit requirements detailed in the SWPPP and associated BMPs required by the Kern County Grading Code and Floodplain Management Ordinance. Conformance with these requirements would minimize stormwater runoff from the project site during construction. Thus, with the implementation of the SWPPP and BMPs required by the Kern County Grading Code (MM 4.10-1 and MM 4.10-2), impacts associated with polluted runoff during construction would be less than significant.

Operation

Development of the project site would create additional impervious surfaces. These changes would not substantially increase the amount of stormwater runoff. The project site is drained by sheet flow and does not rely on constructed stormwater drainage systems. As discussed above, the pattern and

concentration of runoff could be altered by project activities such as grading and installation of the CCS facilities. Impacts related to polluted runoff from operation of the project would be mitigated to less than significant levels with implementation of MM 4.10-2, which requires development of BMPs in compliance with the Kern County Grading Code to limit on-site and off-site erosion and flooding and to suppress dust.

As described above, a large amount of the project site would remain pervious and that would continue to absorb runoff. This also would enable runoff produced by the new minor impervious surfaces to infiltrate within the project site. Further, the drainage plan required by MM 4.10-2 would detail any necessary design features required to properly control stormwater runoff on-site; design features would be appropriately sized for storm events per the final hydrology study performed for the site. Impacts related to storm water drainage systems would be less than significant.

Mitigation Measures

Implementation MM 4.10-1 and MM 4.10-2, as described above.

Level of Significance After Mitigation

Impacts would be less than significant.

(iv) Impede or Redirect Flood Flows

According to the FEMA FIRM, the project is not located within a FEMA-designated 100-year flood zone. As described above, under impact the project site is relatively flat and would remain so post-construction. The project would include a drainage plan that would further minimize the potential for increased flooding from implementation of the project.

Thus, through conformance with all requirements contained within the Kern County Grading Ordinance and implementation of MM 4.10-1 and MM 4.10-2, long-term effects on drainage patterns and the potential to result in flooding on- or off-site, would be less than significant.

Mitigation Measures

Implementation MM 4.10-1 and MM 4.10-2, as described above.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.10-4: Risk Release of Pollutants Due to Project Inundation in a Flood, Tsunami, or Seiche Zone

Construction and Operation

According to the FEMA FIRM, the project is not located within a FEMA-designated 100-year flood zone. A tsunami is a series of ocean waves generated by sudden displacements in the sea floor, landslides, or volcanic activity. A seiche is a standing wave in an oscillating body of water. The project site is located approximately 73 miles east of the Pacific Ocean (near Morro Bay). Additionally, there are no enclosed bodies of water within the project vicinity. Therefore, the risk for tsunami or seiche in the project area is very low and there would be little or no chance for an impact involving release of pollutants during such events. There would be no impact related to release of pollutants due to project inundation in these zones.

Mitigation Measures

No mitigation would be required.

Level of Significance

No impacts would occur.

Impact 4.10-5: Conflict with or Obstruct Implementation of a Water Quality Control Plan or Sustainable Groundwater Management Plan

The project site is located within the Central Valley RWQCB jurisdiction and is subject to the applicable requirements of the Basin Plan administered by the RWQCB in accordance with the Porter-Cologne Water Quality Control Act. However, the project site does not contain any water, nor is it adjacent to a site to which a Basin Plan would apply. Thus, the project would not obstruct the implementation of a water quality control plan. In addition, there is currently no adopted sustainable groundwater management plan that includes the project site.

The proposed source to provide water for the project is the WKWD within the KGA. As such, the WKWD has detailed information regarding groundwater conditions in the vicinity of the proposed project site.

The WKWD covers approximately 1.2 million acres of the Kern County Subbasin's approximately 1.8 million acres, as defined by the California DWR Bulletin 118. The WKWD primarily pumps groundwater but balances this extraction by recharging its SWP water and other supplemental water supplies. The WKWD is allocated 31,500 acre-feet per year of SWP surface water at 100 percent allocation. Based on the WKWD 2020 Urban Water Management Plan (UWMP), the average water year supply is 18,600 acre-feet. According to the UWMP, when SWP water is restricted, the WKWD can meet water demand using banked groundwater supplies. Elk Hills and CRC are customers of WKWD. Elk Hills has an allocation of 3,000 acre-feet per year while CRC has a 2,200 acre-feet per year allocation.

The operation of the CO_2 capture and storage facilities would not conflict with or obstruct implementation of the CWA or Basin Plan because there is no significant surface drainage, no surface water beneficial uses associated with the project area, and the Aquifer Exemption process determined the groundwater cannot serve as a current or future source of drinking water. Therefore, operation of the project would not conflict with or obstruct implementation of a water quality control or groundwater management plan. Furthermore, because there is no applicable Basin Plan or Sustainable Groundwater Management Plan applicable to the site, the project could not conflict with either of these types of plans.

Mitigation Measures

No mitigation would be required.

Level of Significance

No impacts would occur.

4.10.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; an SREIR certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provide evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oil field over 25 years of 3,649 new wells per year countywide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, SB 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021) (Kern County Planning and Natural Resources Department 2021). The 25-year span from 2015 to 2040

has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. CalGEM permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to hydrological resources is considered the Tulare Lake Hydrologic Basin. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on hydrological resources. This geographic scope of analysis is appropriate because the hydrological resources within this area are expected to be similar to those in the project site because of their proximity.

Impact 4.10-6: Contribute to Cumulative Hydrologic Resources Impacts

With regard to impacts to significant hydrologic resources, the project has the potential to contribute significantly to cumulative impacts within the region. A complete analysis of the cumulative impacts of the various ground-disturbing activities from oil and gas and the region wide basin groundwater conditions are provided in Section 4.9, *Hydrology and Water Quality* (Kern County Oil and Gas EIR). Through implementation of MM 4.9-1, MM 4.10-1 through MM 4.10-5, and MM 4.19-1 impacts to hydrological resources would be mitigated.

As described in Chapter 3, *Project Description*, of this EIR, there are multiple projects proposed throughout Kern County and the Southern San Joaquin Valley, including solar facilities, agricultural trucking facilities, telecommunications infrastructure, and commercial development. Many projects are anticipated to not be located within or adjacent to waters of the United States or wetland areas and would not result in discharges to those resources.

Water Quality

The proposed project's potential impacts on water quality from erosion and sedimentation are expected to be localized and temporary during construction. During project operation, runoff from rainwater would drain naturally and most water would infiltrate the ground surface. While some rainfall from the margins of the site could flow off-site via sheet flow, effects would be minimal and the potential for substantial erosion that could occur under concentrated runoff condition is considered low. Nonetheless, where potential for channel erosions exists, MM 4.9-1, MM 4.10-1, MM 4.10-2, MM 4.10-3, MM 4.10-4, and MM 4.10-5 would be implemented to prevent long-term impacts on drainage patterns and water quality. In addition, all cumulative projects would be subject to and includes similar mitigation to include MM 4.10-1, which requires the project to prepare and implement a SWPPP in accordance with County requirements. All projects that would not retain all runoff on-site would be required to prepare a SWPPP, which would include BMPs designed to prevent the mixture of sediment and other pollutants with stormwater and degrading water quality. Similarly, for other projects that do not yet have a final drainage plan, one would be required prior to issuance of building or grading permits.

The project and other projects, as applicable, would implement a Worker Environmental Awareness Program as part of MM 4.9-1 that would require appropriate handling of hazardous materials on site to ensure they do not come into contact with stormwater and affect water quality. All other projects in the vicinity that would handle hazardous materials would be required to comply with any other applicable hazardous material regulations. Therefore, cumulative scenario impacts associated with water quality degradation would not be cumulatively considerable, and the project would not contribute to a cumulative impact on water quality.

Groundwater Supply

With regard to substantially decreasing groundwater supplies or interfering with groundwater recharge, MM 4.19-1 would be implemented to ensure that any groundwater or reclaimed water used is accounted for should the project require additional water supplies in excess of the allotment from the District. Other projects in the vicinity would also be required to comply with similar water supply regulations.

The WKWD primarily pumps groundwater but balances this extraction by recharging its SWP water and other supplemental water supplies. Such banked water is not considered SWP water any longer once banked and can be used as a project source under CEQA. The WKWD is allocated 31,500 acre-feet per year of SWP surface water at 100 percent allocation when available. Based on the WKWD 2020 UWMP, the average water year supply is 18,600 acre-feet. According to the UWMP, when SWP water is restricted, the WKWD can meet water demand using banked groundwater supplies. Elk Hills and CRC are customers of WKWD. Elk Hills has an allocation of 3,000 acre-feet per year while CRC has a 2,200 acre-feet per year allocation which could come from groundwater supplies since the source is dependent on the WKWD Board, not the applicant. As the basin is currently over drafted and the District's GSP has been deemed inadequate along with the other Kern Subbasin plans where the other similar known and unknown projects could occur, the cumulative impacts of any use of groundwater in the area are considered significant and unavoidable after all feasible and reasonable mitigation.

Erosion, Drainage, and Flooding

With respect to erosion, drainage, and flooding, the project would implement MM 4.10-2, which would minimize direct impacts on erosion, drainage, and flooding. It is anticipated that other cumulative scenario projects would be required to implement similar measures, in order to minimize erosion, drainage, and flooding related impacts. Additionally, drainage related impacts from cumulative scenario projects would be primarily localized. Therefore, cumulative scenario impacts on erosion, drainage, and flooding are not anticipated to be cumulatively considerable, and the project would not contribute to a cumulative impact on flooding, erosion, or drainage.

Mitigation Measures

Implementation of Mitigation Measures MM 4.9-1, MM 4.10-1, MM 4.10-2, MM 4.10-3, MM 4.10-4, MM 4.10-5, and 4.19-1 would be required (see Section 4.9, *Hazards and Hazardous Materials*, and Section 4.19, *Utilities and Service Systems*, for full mitigation measure text).

Level of Significance after Mitigation

Cumulative impacts would be less than significant for water quality and erosion, drainage, and flooding (Impact 4.10-1 and 4.10-3). Cumulative impacts would be significant and unavoidable for groundwater supply (Impact 4.10-2).

Section 4.11

Land Use and Planning

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Section 4.11

Land Use and Planning

4.11.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environmental and regulatory settings for land use and planning. It also describes the impacts on land use and planning that would result from implementation of the California Resources Corporation's (project proponent) proposed Carbon Terra Vault 1 (Kern County) Project (project). The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills Oil Field (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the city of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

The information in this section is based primarily, but not exclusively, on a review of the project's consistency with the Kern County General Plan (KCGP) and the Kern County Zoning Ordinance.

A description of the environmental setting (affected environment) for land use and planning is presented below in Section 4.11.2, *Environmental Setting*. The regulatory setting applicable to land use and planning is also presented in Section 4.11.3, *Regulatory Setting*, and Section 4.11.4, *Impacts and Mitigation Measures*, discusses project impacts and associated mitigation measures.

4.11.2 Environmental Setting

Kern County (County) is California's third largest county, encompassing 8,202 square miles at the southern end of the Central Valley. The project area is in the western portion of the County in the San Joaquin Valley and is bounded by Kings and Tulare Counties to the north, Santa Barbara and San Luis Obispo Counties to the west, the Tehachapi Mountains and the Sierra Nevada Mountain Range to the east, and the northern boundary of the Los Padres National Forest to the south.

Onsite Land Uses

The proposed project site is located within the Elk Hills, which comprises an approximately 75-square-mile (47,800-acre) complex in the San Joaquin Valley of unincorporated Kern County. The project area is characterized by heavy oil and gas exploration and production including existing well pads, processing facilities, pipeline routes, and access roads. Development in the surrounding area is predominantly oil and gas production, agricultural, and municipalities such as the towns of McKittrick, Tupman, Taft, and Buttonwillow.

The project area boundaries encompass a mix of parcels that have been owned and used for oil and gas production or on which leases have been acquired by the project proponent. The nearest urbanized areas to the project site in Kern County are within the boundaries of the City of

Bakersfield (approximately 26 miles), the City of Taft (approximately 8.5 miles), and the unincorporated community of Buttonwillow (approximately 4 miles).

The proposed project is subject to the provisions of the CKGP and Zoning Ordinance.

As discussed in Section 4.9, *Hazards and Hazardous Materials*, the nearest public airport to the project site is the Elk Hills-Buttonwillow Airport located approximately 2 miles northeast of the project site. The project site is not located within any safety or noise contour zone for this airport, nor is the project site located within a designated Kern County Airport Land Use Compatibility Plan.

As discussed in Section 4.2, *Agriculture and Forestry Resources*, the project site is not designated as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland by the California Department of Conservation (DOC). The California DOC Farmland Mapping and Monitoring Program Important Farmland Map designates the project site as Grazing Land, Vacant or Disturbed Land, Rural Residential Land, and Semi-Agricultural and Rural Commercial Land (DOC 2023). There is land designated as Non-Prime Farmland, which is subject to a Williamson Act land use contract, immediately adjacent to the west of the project site.

As discussed in Section 4.10, *Hydrology and Water Quality*, the project site is designated as Zone "X" on the Flood Insurance Rate Map (FIRM) as issued by the Federal Emergency Management Agency (FEMA), which indicates the site is outside of the 0.2 percent annual chance floodplain. No areas were identified on the project site that exhibit characteristics of wetlands as defined by the U.S. Army Corps of Engineers.

As discussed in Section 4.12, *Mineral Resources*, the project site is not located within a Kern County-designated mineral recovery zone (excluding oil and gas). However, the project site is located on lands designated as a Mineral Resource Zone (MRZ-3) by the DOC's State Mining and Geology Board, where known or inferred mineral occurrences of undetermined mineral resource significance are present (CGS 2009). The project site has been identified as being within a Mineral Overlay Parcel (043-210-45) by Kern County.

As shown in Table 4.11-1, the project site is located within unincorporated Kern County and within the administrative boundaries of the KCGP. The project includes zone changes from A-1 (Limited Agriculture) to A (Exclusive Agriculture) on approximately 6,160 acres, inclusion in Agricultural Preserve No. 3 on approximately 1,360.8 acres, Conditional Use Permits (CUPs) on approximately 9,064.60 acres for the carbon capture and storage (CCS) facility, including equipment at initial sources, and a CUP on approximately 29.8 acres for the underground facility carbon dioxide (CO_2) pipeline. The total project site is approximately 9,104 acres. As required by Kern County policy, the areas zoned A (Exclusive Agriculture) are required to be within a Kern County Agricultural Preserve to provide conformity with any eligible land for a Williamson Act land use contract or Farmland Security Zone Contract.

Table 4.11-1: Existing On-Site and Surrounding Land Use, General Plan Map Code Designations, and Zoning.

Location	Existing Land Use	Adopted General Plan Map Code Designations	Existing Zoning
Project Site	Oil and Gas Exploration and Production	8.3 (Extensive Agriculture. 8.3/ 2.1 (Extensive Agriculture Seismic Hazard Overlay) 8.4 (Mineral and Petroleum)	A (Exclusive Agriculture) A-1 (Limited Agriculture)
North	Oil and Gas Exploration and Production; Oil and Gas Ancillary Services Undeveloped Private Lands	1.1 (State or Federal Land) 3.3 (Other Facilities) 8.1/2.3 (Intensive Agriculture and Shallow Ground Water) 8.3 (Extensive Agriculture) 8.3/2.1 (Extensive Agriculture and Seismic Hazard) 8.4 (Mineral and Petroleum)	A (Exclusive Agriculture) A-1 (Limited Agriculture) PL RS MH (Platted Lands, Residential Suburban Combining, Mobile home Combining) AH (Exclusive Agriculture, Airport Approach Height Combining)
South	Oil and Gas Exploration and Production	1.1 (State or Federal Land) 8.4 (Mineral and Petroleum) 8.3 (Extensive Agriculture)	A (Exclusive Agriculture)
East	Oil and Gas Exploration and Production	8.3 (Extensive Agriculture) 8.4/2.4 (Mineral and Petroleum and Steep Slope)	A (Exclusive Agriculture) A-1 (Limited Agriculture) A-1 H (Limited Agriculture, Airport Approach Height Combining)
West	Oil and Gas Exploration and Production	1.1 (State or Federal Land) 8.3 (Extensive Agriculture) 8.3/2.1 (Extensive Agriculture and Seismic Hazard) 8.3/2.5 (Extensive Agriculture and Flood Hazard) 8.4 (Mineral and Petroleum) 8.5 (Resource Management)	A (Exclusive Agriculture)

Existing and Surrounding Land Uses

Existing land uses in the project area were determined from a visual survey of the project area, publicly available geographical information system (GIS) data, and a review of the KCGP. The predominant land use within Elk Hills is oil and gas development with small areas of agricultural and non-jurisdictional land throughout. In general, land uses are grouped as follows:

- **Oil and Gas Development**. Mineral and petroleum extraction is also a predominant land use within the project area and is an allowable use under most zoning designations, as described below (see Table 4.11-1). The Natural Resource (NR) Zoning District designates areas with petroleum, mineral, or timber resources, and limits uses in such areas to resource exploration, production, and transportation, or compatible uses.
- **Agriculture**. Some of the land interspersed throughout the project area is zoned for extensive agricultural uses, such as livestock grazing, dry land farming, and accessory agricultural industries. Uses shall include, but are not limited to, the following: livestock grazing, dry land farming, ranching facilities, wildlife and botanical preserves, timber harvesting, one single-family dwelling unit, irrigated croplands, water storage or groundwater recharge areas, mineral, aggregate, and petroleum exploration and extraction, and recreational activities such as gun clubs and guest ranches. Land within development areas is subject to significant physical constraints.
- **Non-Jurisdictional Land (state and federal).** These lands include all property under the ownership and control of the various state and federal agencies operating in Kern County (military, U.S. Forest Service, Bureau of Land Management, Department of Energy, etc.)

Existing land use in the vicinity of the project site generally includes oil and gas exploration and production and agricultural lands. Development in the area surrounding the project site includes agriculture and grazing land, dry farmed with wheat. The closest sensitive receptor to the project site is McKittrick Elementary School, which is located approximately 4.7 miles southwest of the underground facility pipeline, and the nearest residence is approximately 4.5 miles from injection well 357-7R. Buttonwillow Recreation and Park District is located approximately 7 miles northeast of injection well 355-7R. Buttonwillow Elementary School and Elk Hills Elementary are both located approximately 6 miles from the facility pipeline.

General Plan Land Use Designations

The KCGP provides the underlying land use designations within the project area. Table 4.11-2 lists the predominant land use designation applicable to the project area. The majority of the project area is subject to the Mineral and Petroleum land use designation (General Plan Designation 8.4).

Table 4.11-2: Kern County General Plan Classifications within the Project Area

GP Code	GP Name
1.1	State or Federal Land
3.3	Other Facilities
8.1	Intensive Agriculture (minimum 20 acres)
8.1/2.5	Intensive Agriculture (minimum 20 acres)/Flood Hazard
8.3	Extensive Agriculture (minimum 20 acres)
8.3/2.1	Extensive Agriculture (minimum 20 acres)/Seismic Hazard
8.3/2.4	Extensive Agriculture (minimum 20 acres)/Steep Slope
8.3/2.5	Extensive Agriculture (minimum 20 acres)/Flood Hazard
8.4	Mineral and Petroleum (minimum 5 acres)
8.4/2.4	Mineral and Petroleum (minimum 5 acres)/Steep Slope

Key:
GP = General Plan

Existing Zoning

The Kern County Zoning Ordinance regulates land uses within the project area, implements the underlying KCGP land use designations for applicable locations in the County, and is consistent with the KCGP. The General Plan Map Code Designations in the project area are listed in Table 4.11-3.

The Kern County Zoning Ordinance list has adopted zone districts with lists of permitted uses and lists of uses that are permitted with additional review through processing of a CUP. New types of businesses and industries appear over time and may not be specifically listed in the ordinance. An example of this evolution is that the ordinance still lists in the C-1 (Neighborhood Commercial) zone District Video and Audio tape sales and rental as a permitted use. This type of store has, while everywhere in the past, has been almost completely replaced by the internet. Updating the zoning ordinance is a process of public hearings and official publishing of notices that takes six to eight months. Therefore, it is impractical to update the text for all potential types of new industries or uses every few months. Since its first adoption in 1986, the ordinance has addressed this situation. It provides for procedures to evaluate new uses and determine the proper process for consideration. Chapter 19.08 contains the following pathways for review of uses not specifically listed in the ordinance 19.08.030, Determination of Similar Use and 19.09.085, Alternative to Determination of Similar Use. These determinations are then incorporated into the ordinance at a regularly scheduled comprehensive update.

The proposed project along with the other projects proposed in Kern County, shown on the cumulative project list found in Chapter 3, *Project Description*, have been evaluated under Ordinance Section 19.08.085 Alternative to Determination of Similar Use. The Alternative to Determination of Similar Use ordinance provides that the Planning Director may authorize the

filing of a CUP to allow the establishment of a use not expressly authorized provided the Planning Director determines the proposed use in not inherently incompatible with the purposes of the applicable zoning district. CCS, as proposed in this project, is the mechanical process of capturing and storing atmospheric carbon dioxide in an area with geographic formations and space for storage underground primarily in the existing oilfield areas. While CCS might be related to oil and gas activities, it has also been proposed in association with other types of industrial use, unrelated to the oil and gas industry. The Planning Director has determined that CCS is a storage operation and not a manufacturing operation, and therefore has been evaluated based on that use. The determination memo was issued by the Planning Director in 2022 and made the following determination:

> CCS underground in existing formations or tanks, can only be permitted with the processing of a Conditional Use Permit in the following Zone Districts:
>
> - A – (Exclusive Agriculture) – Conditional Use Permit (Resource Extraction and Energy Development Uses)
> - M-2 and M-2 PD (Medium Industrial) – Conditional Use Permit (Resource Extraction and Energy Development Uses)
> - M-3 and M-3 PD (Medium Industrial) – Conditional Use Permit (Resource Extraction and Energy Development Uses)
>
> CO_2 Pipelines in or crossing any zone district require a Conditional Use Permit if delivering CO_2 for CCS or to tanks for storage.
>
> Based on this interpretation, residential and commercial zones cannot be utilized to process a permit for CCS.
>
> Section 19.06.020 Authority to Administer gives the Planning Director the authority to administer the zoning ordinance, including interpretation of the text. The decision of the Planning Director is final.
>
> Conditional Use Permits are processed under the requirements of Chapter 19.104 Conditional Use Permits and the process in Section 19.102.020. Under Section 19.104.040 Basis for Approval.

The decision-making authority may approve or conditionally approve an application for a conditional use permit if it finds all of the following:

A. The proposed use is consistent with the goals and policies of the applicable General or Specific Plan

B. The proposed use in consistent with the purpose of the applicable district or districts.

C. The proposed use is listed as a use subject to a conditional use permit in the applicable zoning district or districts or the use is determined to be similar to a listed conditional use in accordance with the procedures set out in Sections 19.08.030 through 19.0.080 in this title .

D. The proposed use meets the minimum requirements of this title applicable to the use.

E. The proposed use will not be materially detrimental to the health, Safety, and welfare of the public or to property and residents in the vicinity.

Section 19.107.170 provides that the CUP is considered by the Planning Commission with appeal possible to the Board of Supervisors. However, the related Zone Changes requires the Planning Commission make a recommendation to the Board of Supervisors and they make the final decision. Therefore, both the Zone Changes and CUPs will be heard by the Planning Commission, with final consideration by the Board of Supervisors. No appeal filing will be required. The decision of the Board of Supervisors on both the Zone Change and CUP would be final.

Implementation of the project could not occur without additional approvals from the U.S. Environmental Protection Agency (EPA) for the Class IV Underground Injection Control permits and conformance with all conditions and mitigation.

Proposed Project

Table 4.11-3: Project Assessor Parcel Numbers, General Plan Map Codes, Zoning, and Acreage

APN	General Plan Map Codes	Existing Zoning	Proposed Zoning	Acres	Ag Preserve Inclusion	Conservation Area
Carbon Capture and Storage Facility						
157-070-03	8.3 and 8.3/2.1	A	A	80	Ag Preserve No. 3	
157-060-02	8.4	A	A	640	Ag Preserve No. 3	Elk Hill Conservation Easement
158-040-07	8.3 and 8.3/2.1	A	A	640.8	Ag Preserve No. 3	
158-070-02	8.3	A-1	A	160		
158-070-03	8.4	A-1	A	464.49		
158-070-01	8.4	A-1	A	640.64		
158-070-05	8.4	A-1	A	640		
158-080-06	8.4	A-1	A	640		
158-090-03	8.4	A-1	A	680.9		
158-090-02	8.4	A-1	A	640		
158-090-01	8.4	A-1	A	640		
158-090-07	8.4	A-1	A	0.92		
158-090-16	8.4	A-1	A	14.78		
158-090-18	8.4	A	A	20.96		
158-090-19	8.4	A	A	590.61		
158-090-04	8.4	A	A	682.86		

Table 4.11-3: Project Assessor Parcel Numbers, General Plan Map Codes, Zoning, and Acreage

APN	General Plan Map Codes	Existing Zoning	Proposed Zoning	Acres	Ag Preserve Inclusion	Conservation Area
159-280-01	8.4	A-1	A	644.48		
159-280-07	8.4 and 8.4/2.4	A-1	A	325.37		
298-010-07	8.4	A	A	314.45		
Carbon Capture and Storage Facility Acreage Subtotal				9,101.26		
Underground Facility Pipeline						
158-070-04	8.4	A-1	A-1	2.99[(a)]		
Underground Facility Pipeline Acreage Subtotal				2.99		
Project Parcels Total				**9,104**		

Notes:
[(a)] Portion of APNs included in the 50-foot pipeline corridor.
Land Use Designation:
2.1 = Seismic Hazard
2.4 = Steep Slope
8.3 = Extensive Agriculture (minimum 20-Acre Parcel Size)
8.4 = Mineral and Petroleum
Zone Designation:
A = Exclusive Agriculture
A-1 = Limited Agriculture
Key:
Ag = Agriculture
APN = assessor parcel number

4.11.3 Regulatory Setting

Federal

U.S. Fish and Wildlife Service recovery plans for endangered species apply to the project site. Information on these plans can be found in Section 4.4, *Biological Resources*.

State

Various State agencies have jurisdiction over local agencies and have plans and programs that apply to the project site. They include, but are not limited to, the Amended KGA Groundwater Sustainability Plan, Kern Integrated Regional Water Management Plan, Tulare Lake Basin Portion of Kern County Integrated Regional Water Management Plan, WKWD 2020 Urban Water Management Plan, Recovery Plan for Upland Species of the San Joaquin Valley, California Air Quality Plans, One-Hour Ozone Plan, Eight-Hour Ozone Plan, PM_{10} Maintenance Plan, $PM_{2.5}$ Plans, Air Quality Conformity Determination for Transportation Plans, and California Department of Fish and Wildlife (CDFW) recovery and habitat plans for endangered species. Information on these plans can be found in Section 4.4 *Biological Resources*. Section 4.3, *Air Quality*, Section 4.8, *Greenhouse Gases*, and Section 4.10, *Hydrology and Water.*

Local

Land use and planning decisions within and adjacent to the project site are guided and regulated by the KCGP and Kern County Zoning Ordinance. The KCGP contains goals, objectives, and policies and provides an overall foundation for establishing land use patterns. For this land use impact analysis, this section lists all relevant goals, objectives, policies, and implementation measures related to the proposed project. The Zoning Ordinance contains regulations through which the General Plan's provisions are implemented. The most relevant regulations pertaining to the development of the proposed project are presented below.

Other local and County plans relevant to the project are referenced as applicable, in each Section of this EIR. These plans include Kern County Fire Department Strategic Fire Plan Kern County Fire Department Wildland Fire Management Plan, Kern County Multi-Jurisdiction Hazard Mitigation Plan, Kern County Integrated Waste Management Plan, and Kern County Airport Land Use Compatibility Plan.

Kern County General Plan

The project area is located within the KCGP; therefore, it would be subject to applicable policies and measures of the KCGP (Kern County 2009). The Land Use, Conservation, and Open Space Element, Circulation Element, Noise Element, Safety Element, and Energy Element of the KCGP include goals, policies, and implementation measures related to land use and planning that apply to the project, as described below.

Chapter 1. Land Use, Conservation, and Open Space Element

1.3. Physical and Environmental Constraints

Goals

Goal 1. To strive to prevent loss of life, reduce personal injuries, and property damage, minimize economic and social diseconomies resulting from natural disaster by directing development to areas which are not hazardous.

Policies

Policy 1. Kern County will ensure that new developments will not be sited on land that is physically or environmentally constrained ((Map Code 2.1 (Seismic Hazard), Map Code 2.2 (Landslide), Map Code 2.3 (Shallow Groundwater), Map Code 2.5 (Flood Hazard), Map Codes from 2.6 – 2.9, Map Code 2.10 (Nearby Waste Facility), and Map Code 2.11 (Burn Dump Hazard) to support such development unless appropriate studies establish that such development will not result in unmitigated significant impact.

Policy 3. Zoning and other land use controls will be used to regulate and, in some instances, to prohibit development in hazardous areas.

Policy 8. Encourage the preservation of the floodplain's flow conveyance capacity, especially in floodways, to be open space/passive recreation areas throughout the County.

Policy 9. Construction of structures that impede water flow in a primary floodplain will be discouraged.

Policy 10. The County will allow lands which are within flood hazard areas, other than primary floodplains, to be developed in accordance with the General Plan and Floodplain Management Ordinance, if mitigation measures are incorporated so as to ensure that the proposed development will not be hazardous within the requirements of the Safety Element (Chapter 4) of this General Plan.

Policy 11. Protect and maintain watershed integrity within Kern County.

Implementation Measures

Implementation Measure D. Review and revise the County's current Grading Ordinance as needed to ensure that its standards minimize permitted topographic alteration and soil erosion while maintaining soil stability.

Implementation Measure F. The County will comply with the Colbey-Alquist Floodplain Management Act in regulating land use within designated floodways.

Implementation Measure H. Development within areas subject to flooding, as defined by the appropriate agency, will require necessary flood evaluations and studies.

Implementation Measure J. Compliance with the Floodplain Management Ordinance prior to grading or improvement of land for development or the construction, expansion, conversion or substantial improvements of a structure is required.

Implementation Measure N. Applicants for new discretionary development should consult with the appropriate Resource Conservation District and the California Regional Water Quality Control Board regarding soil disturbances issues.

1.4. Public Facilities and Services

Goals

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.

Goal 9. Serve the needs of industries and Kern County residents in a manner that does not degrade the water supply and the environment and protect the public health and safety by avoiding surface

and subsurface nuisances resulting from the disposal of hazardous wastes, irrespective of the geographic origin of the waste.

Policies

Policy 1. New discretionary development will be required to pay its proportional share of the local costs of infrastructure improvements required to service such development.

Policy 3. Individual projects will provide availability of public utility service as per approved guidelines of the serving utility.

Policy 6. The County will ensure adequate fire protection to all Kern County residents.

Policy 7. The County will ensure adequate police protection to all Kern County residents.

Policy 15. Prior to approval of any discretionary permit, the County shall make the finding, based on information provided by the CEQA documents, staff analysis, and the applicant, that adequate public or private services and resources are available to serve the proposed development.

Implementation Measures

Implementation Measure B. Determine local costs of County facility and infrastructure improvements and expansion which are necessitated by new development of any type and prepare a schedule of charges to be levied on the developer at the site of approval of the Final Map. This implementation can be effectuated by the formation of a County work group.

Implementation Measure C. Project developers shall coordinate with the local utility service providers to supply adequate public utility services.

Implementation Measure D. Involve utility providers in the land use and zoning review process.

Implementation Measure L. Prior to the approval of development projects, the County shall determine the need for fire protection services. New development in the County shall not be approved unless adequate fire protection facilities and resources can be provided.

Implementation Measure N. Secure complete and accurate information on all hazardous wastes generated, handled, stored, treated, transported, and disposed of within or through Kern County.

1.9. Resources

Goals

Goal 1. To contain new development within an area large enough to meet generous protections of foreseeable need, but in locations that will not impair the economic strength derived from the petroleum, agriculture, rangeland, or mineral resources or diminish the other amenities that exist in the County.

Goal 2. Protect areas of important mineral, petroleum, and agricultural resource potential for future use.

Goal 3. Ensure the development of resource areas minimize effects on neighboring resource lands.

Goal 4. Encourage safe and orderly energy development within the County, including research and demonstration projects, and to become actively involved in the decision and actions of other agencies as they affect energy development in Kern County.

Goal 5. Conserve prime agriculture lands from premature conversion.

Policies

Policy 1. Appropriate resource uses of all types will be encouraged as desirable and consistent interim uses in undeveloped portions of the County regardless of General Plan designation.

Policy 5. Areas of low intensity agriculture use (Map Code 8.2 (Resource Reserve), Map Code 8.3 (Extensive Agriculture), and Map Code 8.5 (Resource Management)) should be of an economically viable size in order to participate in the State Williamson Act Program/Farmland Security Zone Contract.

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:

a. Promote groundwater recharge activities in various Zone Districts.
b. Support for the development of Urban Water Management Plans and promote Department of Water Resources grant funding for all water providers.
c. Support the development of groundwater management plans.
d. 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.

Policy 11. Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.

Policy 12. Areas identified by the Natural Resource Conservation Service (formerly Soil Conservation Service) as having high range-site value should be conserved for Extensive Agriculture uses or as Resource Reserve, if located within a County water district.

Policy 14. Emphasize conservation and development of identified mineral deposits

Policy 25. Discourage incompatible land use adjacent to Map Code 8.4 (Mineral and Petroleum) areas.

Implementation Measures

Implementation Measure B. Areas designated as Resource Reserve (Map Code 8.2), Extensive Agriculture (Map Code 8.3), Resource Management (Map Code 8.5) that are under Williamson Act Contracts or Farmland Security Zone Contracts will have a minimum parcel size of 80 acres until such time as a contract is expired or is cancelled, at which time the minimum parcel size will become 20 acres**.**

Implementation Measure C. The County Planning Department will seek review and comment from the County Engineering and Survey Services Department on the implementation of the National Pollution Discharge Elimination System for all discretionary projects.

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.

Implementation Measure G. Property placed under the Williamson Act/Farmland Security Zone Contract must be in a Resource designation**.**

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.

1.10. General Provisions

Goals

Goal 1. Ensure that the County can accommodate anticipated future growth and development while maintaining a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.

1.10.1. Public Services and Facilities

Policies

Policy 9. New development should pay its pro rata share of the local cost of expansions in services, facilities, and infrastructure which it generates and upon which it is dependent.

Policy 15. Prior to approval of any discretionary permit, the County shall make the finding, based on information provided by the California Environmental Quality Act (CEQA) documents, staff analysis, and the applicant, that adequate public or private services and resources are available to serve the proposed development.

Policy 16. The developer shall assume full responsibility for costs incurred in service extensions or improvements that are required to serve the project. Cost sharing or other forms of recovery shall be available when the service extensions or improvements have a specific quantifiable regional significance.

Implementation Measures

Implementation Measure E. All new discretionary development projects shall be subject to the Standards for Sewage, Water Supply and Preservation of Environmental Health Rules and Regulations administered by the Environmental Health Services Department. Those projects having percolation rates of less than five minutes per inch shall provide a preliminary soils study and site-specific documentation that characterizes the quality of upper groundwater in the project vicinity and evaluation of the extent to which, if any, the proposed use of alternative septic systems will adversely impact groundwater quality. If the evaluation indicates that the uppermost groundwater at the proposed site already exceeds groundwater quality objectives of the Regional Water Quality Control Board or would if the alternative septic system is installed, the applicant shall be required to supply sewage collection, treatment and disposal facilities.

1.10.2. Air Quality

Policies

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

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.

Implementation Measures

Implementation Measure F. All discretionary permits shall be referred to the appropriate air district for review and comment.

Implementation Measure G. Discretionary development projects involving the use of tractor trailer rigs shall incorporate diesel exhaust reduction strategies including, but not limited to:

a. Minimizing idling time.
b. Electrical overnight plug-ins.

Implementation Measure H. Discretionary projects may use one or more of the following to reduce air quality effects:

a. Pave dirt roads within the development.
b. Pave outside storage areas.
c. Provide additional low Volatile Organic Compounds (VOC) producing trees on landscape plans.
d. Use of alternative fuel fleet vehicles or hybrid vehicles.
e. Use of emission control devices on diesel equipment.
f. Develop residential neighborhoods without fireplaces or with the use of Environmental Protection Agency certified, low emission natural gas fireplaces.
g. Provide bicycle lockers and shower facilities on site.
h. Increasing the amount of landscaping beyond what is required in the Zoning Ordinance (Chapter 19.86).
i. The use and development of park and ride facilities in outlaying areas.
j. Other strategies that may be recommended by the local Air Pollution Control Districts.

Implementation Measure J. The County should include PM_{10} control measures as conditions of approval for subdivision maps, site plans, and grading permits.

1.10.3. Archaeological, Paleontological, Cultural, and Historical Preservation

Policies

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 Measures

Implementation Measure K. Coordinate with the California State University, Bakersfield's Archaeology Inventory Center.

Implementation Measure L. The County shall address archaeological and historical resources for discretionary projects in accordance with the California Environmental Quality Act (CEQA).

Implementation Measure M. In areas of known paleontological resources, the County should address the preservation of these resources where feasible.

Implementation Measure 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.

Implementation Measure 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.

1.10.5. Threatened and Endangered Species

Goals

Goal 1. Ensure that the County can accommodate anticipated future growth and development while a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.

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 to fish, wildlife, and botanical resources.

Policy 29. The 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 31. Under the provisions of the California Environmental Quality Act (CEQA), the County, as lead agency, will solicit comments from the California Department of Fish and Game and the U.S. Fish and Wildlife Service when an environmental document (Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report) is prepared.

Policy 32. Riparian areas will be managed in accordance with United States Army Corps of Engineers, and the California Department of Fish and Game rules and regulations to enhance the drainage, flood control, biological, recreational, and other beneficial uses while acknowledging existing land use patterns.

Implementation Measures

Implementation Measure Q. Discretionary projects shall consider effects to biological resources as required by the California Environmental Quality Act.

Implementation Measure R. Consult and consider the comments from responsible and trustee wildlife agencies when reviewing a discretionary project subject to the California Environmental Quality Act.

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

1.10.6. Surface Water and Groundwater

Policies

Policy 34. Ensure that water quality standards are met for existing users and future development.

Policy 41. Review development proposals to ensure adequate water is available to accommodate projected growth.

Policy 43. Drainage shall conform to the Kern County Development Standards and the Grading Ordinance.

Policy 44. Discretionary projects shall analyze watershed impacts and mitigate for construction-related and urban pollutants, as well as alterations of flow patterns and introduction of impervious surfaces as required by the California Environmental Quality Act (CEQA), to prevent the degradation of the watershed to the extent practical.

Implementation Measures

Implementation Measure X. Encourage effective groundwater resource management for the long-term benefit of the County through the following:

i. Promote groundwater recharge activities in various Zone Districts.

iii. Support the development of Groundwater Management Plans.

iv. 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 Y. Promote efficient water use by utilizing measures such as:

i. Requiring water-conserving design and equipment in new construction.

ii. Encouraging water-conserving landscaping and irrigation methods.

1.10.7. Light and Glare

Policies

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.

Implementation Measures

Implementation Measure AA. The County shall utilize CEQA Guidelines and the provisions of the Zoning Ordinance to minimize the impacts of light and glare on adjacent properties and in rural undeveloped areas.

Chapter 2. Circulation Element

2.1 Introduction

Goals

Goal 4. Kern County will plan for a reduction of environmental effects without accepting a lower quality of life in the process.

Goal 5. Maintain a minimum [level of service] LOS D for all roads throughout the County unless the roads are part of an adopted Community Plan or Specific Plan which utilizes Smart Growth policies that encourage efficient multi-modal movements (See Section 1.10.8 of the Kern County General Plan).

2.3. Highways

2.3.3. Highway Plan

Goals

Goal 5. Maintain a minimum Level of Service (LOS) D.

2.3.4. Future Growth

Goals

Goal 1. To provide ample flexibility in this plan to allow for growth beyond the 20-year planning horizon.

Policies

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. 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.

Policy 4. As a condition of private development approval, developers shall build roads needed to access the existing road network. Developers shall build these roads to County standards unless improvements along state routes are necessary then roads shall be built to Caltrans standards. Developers shall locate these roads (width to be determined by the Circulation Plan) along centerlines shown on the circulation diagram map unless otherwise authorized by an approved Specific Plan Line. Developers may build local roads along lines other than those on the circulation diagram map. Developers would negotiate necessary easements to allow this.

Implementation Measures

Implementation Measure C. Project development shall comply with the requirements of the Kern County Zoning Ordinance, Land Division Ordinance, and Development Standards.

2.5. Other Modes

2.5.4. Transportation of Hazardous Materials

Goals

Goal 1. Reduce risk to public health from transportation of hazardous materials.

Policies

Policy 1. The commercial transportation of hazardous material, identification and designation of appropriate shipping routes will be in conformance with the adopted Kern County and Incorporated Cities Hazardous Waste Management Plan.

Policy 2. Kern County and affected cities should reduce use of County-maintained roads and city-maintained streets for transportation of hazardous materials.

Implementation Measures

Implementation Measure A. Roads and highways utilized for commercial shipping of hazardous waste destined for disposal will be designated as such pursuant to Vehicle Code Sections 31303 et seq. Permit applications shall identify commercial shipping routes they propose to utilize for particular waste streams.

Chapter 3. Noise Element

3.2. Noise Sensitive Areas

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 2. Require noise level criteria applied to all categories of land uses to be consistent with the recommendations of the California Division of Occupational Safety and Health (DOSH).

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 7. Employ the best available methods of noise control.

Implementation Measures

Implementation Measure A. Utilize zoning regulations to assist in achieving noise-compatible land use patterns.

Implementation Measure C. Review discretionary development plans, programs and proposals, including those initiated by both the public and private sectors, to ascertain and ensure their conformance to the policies outlined in this element.

Implementation Measure F. Require proposed commercial and industrial uses or operations to be designed or arranged so that they will not subject residential or other noise sensitive land uses to exterior noise levels in excess of 65 dB Ldn and interior noise levels in excess of 45 dB Ldn.

Implementation Measure J. Develop implementation procedures to ensure that requirements imposed pursuant to the findings of an acoustical analysis are conducted as part of the project permitting process.

Chapter 4. Safety Element

Goals

Goal 1. Minimize injuries and loss of life and reduce property damage.

4.2. General Policies and Implementation Measures, which Apply to More than One Safety Constraint

Policies

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 oilfield areas, presently under way by various County departments, be continued.

Implementation Measures

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.

Implementation Measure F. The adopted multi-jurisdictional Kern County, California Multi-Hazard Mitigation Plan, as approved by FEMA, shall be used as a source document for preparation of environmental documents pursuant to CEQA, evaluation of project proposals, formulation of potential mitigation, and identification of specific actions that could, if implemented, mitigate impacts from future disasters and other threats to public safety.

4.3. Seismically Induced Surface Rupture, Ground Shaking, and Ground Failure

Implementation Measures

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.

4.5. Landslide, Subsidence, Seiche, and Liquefaction

Policies

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 3. Reduce potential for exposure of residential, commercial, and industrial development to hazards of landslide, land subsidence, liquefaction, and erosion.

4.6. Wildland and Urban Fire

Policies

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 6. All discretionary projects shall comply with the adopted Fire Code and the requirements of the Fire Department.

Implementation Measures

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.

4.9. Hazardous Materials

Implementation Measures

Implementation Measure A. Facilities used to manufacture, store, and use of hazardous materials shall comply with the Uniform Fire Code, with requirements for siting or design to prevent onsite hazards from affecting surrounding communities in the event of inundation.

4.11. Abandoned Open Shafts and Wells

Policies

Policy 2. The County should protect residents from the hazards associated with development in areas where wells have been drilled and abandoned for exploration and/or production of oil and natural gas.

Implementation Measures

Implementation Measure B. Support the construction site review program of the Department of Oil, Gas, and Geothermal Resources that assures wells are precisely located, properly plugged and abandoned, and tested for leakage prior to development of the area.

Chapter 5. Energy Element

5.3.2. Kern County's Economic Dependence on the Oil Marketplace

Policies

Policy 3. The County shall encourage the conversion of existing petroleum-related facilities to other productive uses when they are no longer needed or productive.

Kern County Zoning Ordinance

Title 19 of the Kern County Ordinance provides a description of permitted uses for the various zoning classifications within the County. The Zoning Ordinance consists of two primary parts: a Zoning Map that delineates the boundaries of zoning districts, and a Zoning Code that explains the purpose of the districts, specifies permitted and conditional uses, and establishes development and performance standards. The intent of the Zoning Code is to protect public health, safety, and the general welfare of residents and visitors in the County. Together with the Zoning Map, the Zoning Code identifies the particular uses permitted on each parcel of land in the County and sets forth regulations and standards for development to ensure that the policies, goals, and objectives of the KCGP are implemented. In addition to land use regulations, the Zoning Code contains development standards that can lessen a new structure's impacts on a location or area. These standards control the height, setbacks, parking lot coverage, gross floor area, etc. for new structures. The Zoning Code also regulates which uses are permitted in each of the County's zoning districts to ensure compatibility between land uses.

4.11.4 Impacts and Mitigation Measures

Methodology

For the purposes of this analysis, relevant documents (particularly the KCGP, the Kern County Zoning Ordinance, and Elk Hills Habitat Conservation Plan) were consulted, and a Google Earth visual survey of the project area was performed. A discussion of the Project's consistency with plans and policies for each environmental topic area is summarized below and is described in greater detail in each of the relevant environmental topic sections (Sections 4.1 through 4.17).

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist identify the following criteria, as established in Appendix G of the CEQA Guidelines, to determine if a project could potentially have a significant adverse effect on land use.

A project could have a have a significant adverse effect on land use if the project would:

a. Physically divide an established community;

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

Impacts and Mitigation Measures

Impact 4.11-1: Physically Divide an Established Community

There would be no impacts because there are no established residential communities in the project area. The use of all new CCS facilities, including wells, pipelines, and ancillary infrastructure, would be considered compatible land use because they would be operated in areas in which oil and gas activity is currently the primary land use. Furthermore, the project does not have the potential to create a physical barrier in the middle of an existing community because the CSS facilities are not considered large barrier structures. The CSS facilities would be constructed in an area where there are no established communities. Therefore, the project would not result in the physical division of an established community. No impacts would result.

Mitigation Measures

No mitigation measures are required.

Level of Significance

No impact would occur.

Impact 4.11-2: Conflict with Any Applicable Land Use Plan, Policy, or Regulation Adopted for the Purpose of Avoiding or Mitigating an Environmental Effect

The KCGP and the Kern County Zoning Ordinance establish land use policies and regulations, adopted for the purpose of avoiding or mitigating an environmental effect, that are applicable to the project. The following discussion evaluates the project's consistency with these plans, policies and regulations in the lands for which the County has jurisdiction. Implementation of the project would require approval of CUPs. and changes in zone districts for KCGP consistency and conformance to the Alternative to Determination of Similar Use.

The proposed project would be consistent with plans, policies, and goals of the KCGP, as analyzed in Table 4.11-4, below.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
KERN COUNTY GENERAL PLAN	
CHAPTER 1. LAND USE, OPEN SPACE, AND CONSERVATION ELEMENT	
1.2 NON-JURISDICTIONAL LAND	
Goal 1. To promote harmonious and mutually beneficial uses of land among the various jurisdictions and land management entities present in Kern County.	CONSISTENT. The project promotes harmonious and mutually beneficial uses among various jurisdictions because the project proposes a project that is consistent with the existing land use of the project area.
Policy 3. The County retains the maximum discretion allowed by law over land use issues of local concern, which impact the development of private and public property in the County.	CONSISTENT. The project maintains the County's authority over land use issues. The County is exercising its discretion over land use issues by processing and considering at a public hearing a Conditional Use Permit for a Carbon Capture and Storage Facility within its jurisdiction.
Policy 6. The County will solicit a city's comments on land use planning proposals within the city's adopted sphere of influence or within one mile of the city limits, whichever is greater.	CONSISTENT. With the publication of the NOP, the County notified all local governments within the project Area to solicit comments.
1.3 PHYSICAL AND ENVIRONMENTAL CONSTRAINTS	
Goal 1. To strive to prevent loss of life, reduce personal injuries, and property damage, minimize economic and social diseconomies resulting from natural disaster by directing development to areas which are not hazardous.	CONSISTENT. Consistent with this policy, the project would develop a CO_2 capture site and associated facilities that are not located on a hazardous site. See Section 4.9, *Hazards and Hazardous Materials*, of this EIR. As described in Section 4.7, *Geology and Soils*, of this EIR, the project site is not transected by a known active or potentially active fault and is not located within a State of California Alquist-Priolo Earthquake Fault Zone. Adherence to all applicable regulations and mitigation would reduce potential impacts associated with fault rupture adjacent to the proposed project site. Based on the absence of any known active faults that cross, or are located in close proximity to, the project site and project compliance with applicable ordinances of the Kern County Building Code, and compliance with MM 4.7-1, the potential impact of fault rupture would be less than significant. Additionally, the proposed project would implement all other recommendations of the final design level geotechnical report. The final report's recommendations would be consistent with the Kern County Building Code (Chapter 17.08) and the most recent version of the California Building Code. As described in Section 4.10, *Hydrology and Water Quality*, of this EIR, the project site is not located within the 100-year floodplain and is classified as having a 1 percent annual chance of flooding. Implementation of MM 4.10-2 would require preparation of a drainage plan that would design project

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
	facilities to have 1 foot of freeboard clearance above the calculated maximum flood depths for the finished floor of any permanent structures and grading for the project would be designed so that water surface elevations during flood events would not be increased by more than 1 foot. Further, the project would be developed in accordance with the General Plan and Floodplain Management Ordinance. Thus, final review of the proposed project by the Kern County Planning and Natural Resources Department, as well as adherence to all applicable local, state, and federal regulations, would ensure that the proposed project would not pose significant environmental or public health and safety hazards. As such, with implementation of mitigation measures the project would be consistent with this goal.
Policy 1. Kern County will ensure that new developments will not be sited on land that is physically or environmentally constrained ((Map Code 2.1 (Seismic Hazard), Map Code 2.2 (Landslide), Map Code 2.3 (Shallow Groundwater), Map Code 2.5 (Flood Hazard), Map Codes from 2.6 – 2.9, Map Code 2.10 (Nearby Waste Facility), and Map Code 2.11 (Burn Dump Hazard)) to support such development unless appropriate studies establish that such development will not result in unmitigated significant impact.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Goal 1, of the Kern County General Plan, above.
Policy 3. Zoning and other land use controls will be used to regulate and, in some instances, to prohibit development in hazardous areas.	CONSISTENT. Hazards and hazardous materials impacts are evaluated in Section 4.9, *Hazards and Hazardous Materials*, of this EIR. Consistent with this policy, the project would comply with the requirements of the Kern County Zoning Ordinance, Land Division Ordinance, and Development Standards.
Policy 8. Encourage the preservation of the floodplain's flow conveyance capacity, especially in floodways, to be open space/passive recreation areas throughout the County.	CONSISTENT. See Section 4.10, *Hydrology and Water Quality*, of this EIR. As described therein, the project site is not located within the 100-year floodplain and is classified as having a 1 percent annual chance of flooding. Further, the project would be developed in accordance with the Kern County General Plan, Floodplain Management Ordinance and would implement MM 4.10-1 and MM 4.10-2, as described in that section.
Policy 9. Construction of structures that impede water flow in a primary floodplain will be discouraged.	CONSISTENT. See Section 4.10, *Hydrology and Water Quality*, of this EIR. As described therein, the project site is not located within the 100-year floodplain and is classified as having a 1 percent annual chance of flooding. Further, the project would be developed in accordance with the Kern County General Plan, Floodplain Management Ordinance and would implement MM 4.10-1 and MM 4.10-2, as described in that section.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Policy 10. The County will allow lands which are within flood hazard areas, other than primary floodplains, to be developed in accordance with the General Plan and Floodplain Management Ordinance, if mitigation measures are incorporated so as to ensure that the proposed development will not be hazardous within the requirements of the Safety Element (Chapter 4) of this General Plan.	CONSISTENT See Section 4.10, *Hydrology and Water Quality*, of this EIR. As described therein, the project site is not located within the 100-year floodplain and is classified as having a 1 percent annual chance of flooding. Further, the project would be developed in accordance with the Kern County General Plan, Floodplain Management Ordinance and would implement MM 4.10-1 and MM 4.10-2.
Policy 11. Protect and maintain watershed integrity within Kern County.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Goal 1 and Policy 9 of the Kern County General Plan, above. As discussed in Section 4.10, *Hydrology and Water Quality*, of the EIR, the project site would implement BMPs during construction to avoid impacts to water quality. As described in Section 4.9, *Hazards and Hazardous Materials*, of this EIR, the project would also implement MM 4.9-1, which would require the project proponent to provide a Hazardous Materials Business Plan to reduce mixing of pollutants with stormwater onsite, thereby maintaining the integrity of the watershed.
Implementation Measure D. Review and revise the County's current Grading Ordinance as needed to ensure that its standards minimize permitted topographic alteration and soil erosion while maintaining soil stability.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Goal 1 and Policy 9 and Policy 11 of the Kern County General Plan, above. The project would implement MM 4.10-1 and M M 4.10-2, which would require the preparation of a Storm Water Pollution Prevention Plan (SWPPP) which would require the project operator to conform to the requirements of Kern County's NPDES Program and that would include erosion control and sediment control BMPs designed to prevent disturbed soils from moving offsite. A hydrologic study also would be prepared that would include the designs for a drainage plan that would minimize the potential for changes in the existing drainage patterns to increase erosion and sedimentation. A grading permit would be obtained from the County prior to commencement of construction activities. Compliance to Chapter 17.28 of the Kern County Grading Ordinance would ensure both structural and nonstructural BMPs.
Implementation Measure F. The County will comply with the Colbey-Alquist Floodplain Management Act in regulating land use within designated floodways.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Goal 1 and Policy 9 and Policy 11 of the Kern County General Plan, above, and Section 4.10 *Hydrology and Water Quality*. The project facilities would be designed to maintain clearance above the maximum flood depths and grading would not substantially increase flooding depths. Further, the project would be developed in accordance with the Kern County General Plan, Floodplain Management Ordinance and MM 4.10-1 and MM 4.10-2. Therefore, the project would be consistent with this measure.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Implementation Measure H. Development within areas subject to flooding, as defined by the appropriate agency, will require necessary flood evaluations and studies.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Goal 1 and Policy 9 and Policy 11 of the Kern County General Plan, above and Section 4.10 *Hydrology and Water Quality* of this EIR, the project site is not located within the 100-year floodplain and is classified as having a 1 percent annual chance of flooding. Further, the project would be developed in accordance with the Kern County General Plan, Floodplain Management Ordinance and MM 4.10-1 and MM 4.10-2.
Implementation Measure J. Compliance with the Floodplain Management Ordinance prior to grading or improvement of land for development or the construction, expansion, conversion or substantial improvements of a structure is required.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Goal 1 and Policy 9, Policy 11, and Measure H, of the Kern County General Plan, above.
Implementation Measure N. Applicants for new discretionary development should consult with the appropriate Resource Conservation District and the California Regional Water Quality Control Board regarding soil disturbances issues.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Policy 11 and Measure D of the Kern County General Plan, above. The project would implement BMPs in accordance with a SWPPP that would be required to comply with Kern County's National Pollutant Discharge Elimination System (NPDES). This would ensure compliance with the State Water Resources Control Board's Construction General Permit, as applicable
1.4 PUBLIC FACILITIES AND SERVICES	
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 project.	CONSISTENT. As discussed in Section 4.15, *Public Services* of this EIR, the project would implement MM 4.15-3 to provide a Cumulative Impact Charge (CIC) to provide funding to offset the regional impacts on County services as the surface uses must be restricted for the CCS projects on over 37,000 acres of known project surface land that if approved, cannot be developed for uses that pay property taxes to support all County service. Further, MM 4.15-4 would provide annual funding for the fire department and MM 4.15-5 would provide for funding upon ending of injection activities for County services.
Goal 5. Ensure that adequate supplies of quality (appropriate for intended use) water are available to residential, industrial, and agricultural users within Kern County.	CONSISTENT. As discussed in Section 4.19, *Utilities and Service Systems*, of this EIR, a project-specific Water Supply Assessment was prepared for the project. Based on estimated project construction and operational water demands per the report, there is sufficient water available to meet the projected water demands of the project. However, water supplies have the potential to be adversely affected if the project in the future demands more water than is available. Therefore, the project would implement MM 4.19-1 to ensure that any

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
	groundwater or reclaimed water used is regulated to ensure that the project would have sufficient water supplies to serve the project and reasonably foreseeable future development.
Goal 9. Serve the needs of industries and Kern County residents in a manner that does not degrade the water supply and the environment and protect the public health and safety by avoiding surface and subsurface nuisances resulting from the disposal of hazardous wastes, irrespective of the geographic origin of the waste.	CONSISTENT. As discussed in Section 4.10, *Hydrology and Water Quality*, the operator shall comply with all applicable federal, state, regional, and local agency water quality protection laws and regulations, and commonly utilized industry standards, including obtaining all applicable stormwater construction permits from the Central Valley Regional Water Quality Control Board (CVRWQCB). The operator would also implement best management practices, such as those set forth in the Kern County Grading Ordinance. In addition, because project construction would cause more than 1 acre of ground disturbance, the project would implement Mitigations Measures MM 4.10-1 through MM 4.10-3 requiring a (SWPPP to prevent the occurrence of soil erosion and discharge of other construction-related pollutants that could contaminate water quality within any areas of the project. Per Mitigation Measures MM 4.10-4 and MM 4.10-5, the Underground Injection Control program would prevent discharge into any underground source of current or future beneficial use groundwater. Injection of CO_2 into the ground via injection well would not mix with or contaminate groundwater. Therefore, operation of the project would not violate water quality standards, waste discharge requirements, or degrade surface or water quality in the area.
Policy 1. New discretionary development will be required to pay its proportional share of the local costs of infrastructure improvements required to service such development	CONSISTENT. The project would construct and operate a CCS facility and associated facilities. All infrastructure improvements associated with the project would be fully funded by the project proponent. No further improvements are anticipated as a part of the project. However, should improvements be made, the project proponent would coordinate with the County to ensure that the cost of the infrastructure improvement is properly funded. As discussed in Section 4.15, *Public Services*, the project would implement MM 4.15-3 to provide a CIC to offset the regional impacts on County services as the surface uses must be restricted for the CCS projects on over 37,000 acres of known project surface land that if approved, cannot be developed for uses that pay property taxes to support all County services. The project would also implement MM 4.15-4 to ensure that the cost of emergency preparation in the event of CO_2 release is fully funded and MM 4.15-5 to ensure that all requirements, including payments, have been met prior to final closure of the facility.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Policy 3. Individual projects will provide availability of public utility service as per approved guidelines of the serving utility.	CONSISTENT. Public utility impacts are evaluated in Section 4.19, *Utilities and Service Systems*, of the EIR. As described therein, the project would have less-than-significant impacts on water, wastewater treatment, storm water drainage, electric power, natural gas, or telecommunications facilities. However, regarding water supplies, the project has the potential to adversely affect groundwater or reclaimed water reserve if the project in the future demands more water than is available. The project would implement MM 4.19-1 to ensure that any groundwater or reclaimed water used is accounted for and regulated.
Policy 6. The County will ensure adequate fire protection to all Kern County residents	CONSISTENT. See 1.4, Public Services and Facilities, Goal 1, above. The project would implement MM 4.15-3 to provide a CIC to offset the regional impacts on County services as the surface uses must be restricted for the CCS projects on over 37,000 acres of known project surface land that if approved, cannot be developed for uses that pay property taxes to support all County services.
Policy 7. The County will ensure adequate police protection to all Kern County residents.	CONSISTENT. See 1.4, Public Services and Facilities, Goal 1, above. The project would implement MM 4.15-3 to provide a CIC to offset the regional impacts on County services as the surface uses must be restricted for the CCS projects on over 37,000 acres of known project surface land that if approved, cannot be developed for uses that pay property taxes to support all County services.
Policy 15. Prior to approval of any discretionary permit, the county shall make the finding, based on information provided by the CEQA documents, staff analysis, and the applicant, that adequate public or private services and resources are available to serve the proposed development.	CONSISTENT. Consistent with this goal, the project requires consideration and approval of a CUP, as well as other discretionary actions that ensure compliance with all policies. The project would implement MM 4.15-3 to provide a CIC to offset the regional impacts on County services as the surface uses must be restricted for the CCS projects on over 37,000 acres of known project surface land that if approved, cannot be developed for uses that pay property taxes to support all County services.
Implementation Measure B. Determine local costs of county facility and infrastructure improvements and expansion which are necessitated by new development of any type and prepare a schedule of charges to be levied on the developer at the site of approval of the Final Map. This implementation can be effectuated by the formation of a county work group.	CONSISTENT. See 1.4, Public Services and Facilities, Goal 1, above. Though the project would require no new fire protection, law enforcement protection, or public facilities to accommodate the proposed project, the project could increase demand for such facilities in the future. Therefore, the project would implement MM 4.15-1 through MM 4.15-5 requiring the project proponent to coordinate with the County to ensure that the cost of the infrastructure improvement is properly funded by the project.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Implementation Measure C. Project developers shall coordinate with the local utility service providers to supply adequate public utility services.	CONSISTENT. Project effects related to utilities are discussed in Section 4.19, *Utilities and Service Systems*, of this EIR. The project would result in less than significant impacts to utilities.
Implementation Measure L. Prior to the approval of development projects, the county shall determine the need for fire protection services. New development in the county shall not be approved unless adequate fire protection facilities and resources can be provided.	CONSISTENT. Impacts to fire protection services are evaluated in Section 4.15, *Public Services*, of this EIR. The project would implement MM 4.15-3, to provide an annual payment to the Fire Department for special training and equipment for emergency response.
Implementation Measure N. Secure complete and accurate information on all hazardous wastes generated, handled, stored, treated, transported, and disposed of within or through Kern County.	CONSISTENT. Chapter 3, *Project Description* and Section 4.9, *Hazards and Hazardous Materials* of this EIR describes hazardous wastes generated, handled, stored, treated, transported, and disposed of with respect to CCS development in the project area.
1.9 RESOURCE	
Goal 1. To contain new development within an area large enough to meet generous protections of foreseeable need, but in locations that will not impair the economic strength derived from the petroleum, agriculture, rangeland, or mineral resources or diminish the other amenities that exist in the County.	CONSISTENT. The project site is located on land that is zoned as A (Exclusive Agriculture) and A-1 (Limited Agriculture) which still allows for agricultural uses 'by-right' within the project area. This means that the project area could potentially be leased for agricultural or farming purposes. The project would implement MM 4.2-1 to reduce impacts to agricultural or farming operations if the project area is leased for those purposes during project implementation. The project would not involve additional change in the existing environment besides those described in this EIR and would not directly lead to other projects that would result in the loss of grazing or cultivation land. While the project site has been used for oil extraction, and there is an oil/gas facility within the project boundaries, the project would not interfere with current oil and mineral extraction operations and the existing well would not be disturbed or removed as part of the project. As described in Section 4.12, *Mineral Resources,* of this EIR the project would, however, preclude enhanced oil recovery (EOR) within project area.
Goal 2. Protect areas of important mineral, petroleum, and agricultural resource potential for future use.	CONSISTENT. See 1.9, Resource, Goal 1, above. As discussed in Section 4.12, *Mineral Resources*, of the EIR, the project site is designated as MRZ 3 (where known or inferred mineral occurrences of undetermined mineral resource significance are present) by the Conservation's State Mining and Geology Board. Implementation of the project would result in the loss of oil exploration and extraction with over 200 wells abandoned for project implementation. Further use of EOR, is prohibited by law. The project would result in a significant and unavoidable impact. MM 4.12-1 would be

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
	implemented to address the impacts associated with the potential loss of oil as a result of the project.
Goal 3. Ensure the development of resource areas minimize effects on neighboring resource lands.	CONSISTENT. The project is compatible with open space and other resource management land uses. Furthermore, the placement of facilities at the project site may deter other urban and suburban land uses from being developed nearby. The project would not preclude the existing nearby agricultural, mineral, and petroleum extraction uses from operating.
Goal 4. Encourage safe and orderly energy development within the county, including research and demonstration projects, and to become actively involved in the decision and actions of other agencies as they affect energy development in Kern County.	CONSISTENT. The project would develop CO_2 capture sites and associated facilities. The location of the site would ensure a safe and orderly development of the project facilities. Additionally, the NOP of this EIR was sent to state and federal agencies requesting their input to ensure that appropriate information about the project site were being gathered. Similarly, this EIR will also be circulated to these agencies, and staff will have the opportunity to comment on the environmental analyses. Therefore, the County is complying with this goal for the project.
Policy 1. Appropriate resource uses of all types will be encouraged as desirable and consistent interim uses in undeveloped portions of the county regardless of General Plan designation.	CONSISTENT. The project would allow the continued use of the site and is surrounding adjacent parcels for both agricultural uses and oil and gas exploration.
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.	CONSISTENT. See 1.9, Resource, Goal 5, of the Kern County General Plan, above.
Policy 10. To encourage effective groundwater resource management for the long-term economic benefit of the county, the following shall be considered: (a) Promote groundwater recharge activities in various zone districts. (b) Support for the development of Urban Water Management Plans and promote Department of Water Resources grant funding for all water providers. (c) Support the development of groundwater management plans. (d) 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.	CONSISTENT. As discussed in Section 4.10, *Hydrology and Water Quality*, the operator would implement a SWPPP, which would reduce impacts on groundwater. In addition, the project would not hinder County efforts to develop Urban Water Management Plans, promote Department of Water Resources grant funding, develop groundwater management plans, or develop future sources of additional surface and groundwater.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Policy 11. Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Policy 11 and Measure D and Measure N of the Kern County General Plan, above. The project would not result in the removal of alteration of any drainages.
Policy 14. Emphasize conservation and development of identified mineral deposits.	CONSISTENT. As discussed in Section 4.12, *Mineral Resources*, of this EIR, and See 1.9, Resource, Goal 1, 3, and 5. While the project would impede the use of the site of oil and gas exploration, this alternative use of the underground pore space has been determined to be constitute with utilization of mineral deposit (oil and gas) areas.
Policy 25. Discourage incompatible land use adjacent to Map Code 8.4 (Mineral and Petroleum) areas.	CONSISTENT. See 1.9, Resource, Policy 14, of the Kern County General Plan, above.
Implementation Measure B. Areas designated as Resource Reserve (Map Code 8.2), Extensive Agriculture (Map Code 8.3), Resource Management (Map Code 8.5) that are under Williamson Act Contracts or Farmland Security Zone Contracts will have a minimum parcel size of 80 acres until such time as a contract is expired or is cancelled, at which time the minimum parcel size will become 20 acres**.**	CONSISTENT. There is no active agriculture or grazing on the site that qualifies for a Williamsons Act Contract or Farmland Security Zone Contract. The project, therefore, is consistent with this policy.
Implementation Measure C. The County Planning Department will seek review and comment from the County Engineering and Survey Services Department on the implementation of the National Pollution Discharge Elimination System for all discretionary projects.	CONSISTENT. As discussed in Section 4.10, *Hydrology and Water Quality*, construction activities in the project area that could result in a discharge to waters of the U.S. are subject to the California NPDES General Construction Permit (General Construction Activity NPDES Storm Water Permit, 2009-0009-DWQ and 2010-0014-DWQ).
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.	CONSISTENT. According to the California DOC Farmland Mapping and Monitoring Program (FMMP), no Prime farmland is present on the project site; the majority of the site is designated as Vacant or Disturbed Land, Nonagricultural and Natural Vegetation, Grazing, and Urban and Built-Up Land.
Implementation Measure G. Property placed under the Williamson Act/Farmland Security Zone Contract must be in a Resource designation**.**	CONSISTENT. See 1.9, Resource, Goal 5, of the Kern County General Plan, above.
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.	CONSISTENT. See 1.9, Resource, Goal 1, and Goal 2 and Policy 14, of the Kern County General Plan, above.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
1.10 GENERAL PROVISIONS	
Goal 1. Ensure that the County can accommodate anticipated future growth and development while maintaining a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.	CONSISTENT. Consistent with this goal, the project requires consideration and approval of a CUP, as well as other discretionary actions that ensure compliance with all policies. The project would implement MM 4.15-3 to provide a CIC to offset the regional impacts on County services as the surface uses must be restricted for the CCS projects on over 37,000 acres of known project surface land that if approved cannot be developed for uses that pay property taxes to support all County services.
1.10.1 PUBLIC SERVICES AND FACILITIES	
Policy 9. New development should pay its pro rata share of the local cost of expansions in services, facilities, and infrastructure which it generates and upon which it is dependent.	CONSISTENT. See 1.4, Public Facilities and Services, Goal 1, above.
Policy 15. Prior to approval of any discretionary permit, the County shall make the finding, based on information provided by the California Environmental Quality Act (CEQA) documents, staff analysis, and the applicant, that adequate public or private services and resources are available to serve the proposed development.	CONSISTENT. Consistent with this goal, the project requires consideration and approval of a CUP as well as other discretionary actions that ensure compliance with all policies. The project would implement MM 4.15-3 to provide a CIC to offset the regional impacts on County services as the surface uses must be restricted for the CCS projects on over 37,000 acres of known project surface land that if approved cannot be developed for uses that pay property taxes to support all County services. The project would also implement MM 4.15-4 to ensure that the cost of emergency preparation in the event of CO_2 release is fully funded and MM 4.15-5 to ensure that all requirements, including payments, have been met prior to final closure of the facility.
Policy 16. The developer shall assume full responsibility for costs incurred in service extensions or improvements that are required to serve the project. Cost sharing or other forms of recovery shall be available when the service extensions or improvements have a specific quantifiable regional significance.	CONSISTENT. See 1.4, Public Facilities and Services, Goal 1, Policy 1, and Policy 15, above.
Implementation Measure C. project developers shall coordinate with the local utility service providers to supply adequate public utility services.	CONSISTENT. See 1.4, Public Facilities and Services, Policy 9, above.
Implementation Measure D. Involve utility providers in the land use and zoning review process.	CONSISTENT. See 1.4, Public Facilities and Services, Policy 9, above.
Implementation Measure E. All new discretionary development projects shall be subject to the Standards for Sewage, Water Supply, and Preservation of	CONSISTENT. See 1.4, Public Facilities and Services, Goal 5. Water and wastewater impacts are evaluated in Section 4.10, *Hydrology and Water Quality*,

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Environmental Health Rules and Regulations administered by the Environmental Health Services Department. Those projects having percolation rates of less than five minutes per inch shall provide a preliminary soils study and site specific documentation that characterizes the quality of upper groundwater in the project vicinity and evaluation of the extent to which, if any, the proposed use of alternative septic systems will adversely impact groundwater quality. If the evaluation indicates that the uppermost groundwater at the proposed site already exceeds groundwater quality objectives of the Regional Water Quality Control Board, or would if the alternative septic system is installed, the applicant shall be required to supply sewage collection, treatment, and disposal facilities.	and Section 4.19, *Utilities and Service Systems*, of this EIR. No off-site water or sewage connections to municipal systems are proposed. During construction and operation, bottled water would be provided, and portable toilets and hand washing facilities are proposed. Final review of the project by the Kern County Planning and Natural Resources Department, as well as adherence to all applicable local, state, and federal regulations, would ensure that the project would not pose significant environmental or public health and safety hazards.
1.10.2 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.	CONSISTENT. Air quality and GHG impacts are evaluated in Sections 4.3, *Air Quality*, and 4.8, *Greenhouse Gas Emissions*, of this EIR. Consistent with this policy, the proposed project would implement MM 4.3-1 through MM 4.3-6, which would reduce impacts to air quality to the extent feasible. Air quality mitigation measures include diesel emission reduction measures during construction, fugitive dust control measures, and Valley Fever exposure minimization measures.
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 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.	CONSISTENT. See 1.10.2, Air Quality, Policy 18, above. This EIR serves to comply with this policy. The project cannot reduce impacts to less than significant, even with required mitigation. Appropriate findings under CEQA would be required to be made by the decision makers to approve the project despite the significant and unavoidable cumulative impacts on air quality.
Policy 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.	CONSISTENT. Air quality impacts are evaluated in Section 4.3, *Air Quality*, of this EIR. As discussed therein, implementation of MM 4.3-2 would further reduce fugitive dust emissions during construction and operation, in compliance with the adopted rules and regulations of the San Joaquin Valley Air Pollution Control District on ministerial permits.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Policy 21. The County shall support air districts' efforts to reduce PM10 and PM2.5 emissions.	CONSISTENT. See 1.10.2, Air Quality, Policy 20, above air quality impacts are evaluated in Section 4.3, *Air Quality*, of this EIR. As discussed in that section, implementation of MM 4.3-8 would further reduce PM10 and PM2.5 emissions during construction and operation.
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.	CONSISTENT. Air quality impacts are evaluated in Section 4.3, *Air Quality*, of this EIR. Consistent with this policy, the proposed project would implement MM 4.3-1 through MM 4.3-8, which would reduce impacts to air quality to the extent feasible. The project would comply with all applicable San Joaquin Valley Air Pollution Control District rules and regulations.
Implementation Measure F. All discretionary permits shall be referred to the appropriate air district for review and comment.	CONSISTENT. Air quality impacts are evaluated in Section 4.3, *Air Quality*, of this EIR. Consistent with this measure, the necessary discretionary permits would be referred to the San Joaquin Valley Air Pollution Control District for review and comment.
Implementation Measure G. Discretionary development projects involving the use of tractor trailer rigs shall incorporate diesel exhaust reduction strategies including, but not limited to: • Minimizing idling time. • Electrical overnight plug-ins.	CONSISTENT. Air quality impacts are evaluated in Section 4.3, *Air Quality*, of this EIR. Consistent with this measure, implementation of MM 4.3-3 and MM 4.3-4 would require diesel exhaust reduction strategies.
Implementation Measure H. Discretionary projects may use one or more of the following to reduce air quality effects: a. Pave dirt roads within the development. b. Pave outside storage areas. c. Provide additional low Volatile Organic Compounds (VOC) producing trees on landscape plans. d. Use of alternative fuel fleet vehicles or hybrid vehicles. e. Use of emission control devices on diesel equipment. f. Develop residential neighborhoods without fireplaces or with the use of Environmental Protection Agency certified, low emission natural gas fireplaces. g. Provide bicycle lockers and shower facilities on site.	CONSISTENT. See 1.10.2, Air Quality, Policies 18 through 21, above. This EIR serves to comply with this policy.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
h. Increasing the amount of landscaping beyond what is required in the Zoning Ordinance (Chapter 19.86). i. The use and development of park and ride facilities in outlying areas. j. Other strategies that may be recommended by the local Air Pollution Control Districts.	
Implementation Measure J. The County should include PM10 control measures as conditions of approval for subdivision maps, site plans, and grading permits.	See 1.10.2, Air Quality, Policies 18 through 21, above. This EIR serves to comply with this policy.
1.10.3 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.	CONSISTENT. Cultural resource impacts are evaluated in Section 4.5, *Cultural Resources*, of this EIR. This EIR serves to comply with this policy and includes MM 4.5-1 through MM 4.5-4 to promote the preservation of cultural and historic resources where necessary.
Implementation Measure L. The County shall address archaeological and historical resources for discretionary projects in accordance with the California Environmental Quality Act (CEQA).	CONSISTENT. See 1.10.3, Archaeological, Paleontological, Cultural, and Historical Preservation, Policy 25 and Measure K, above. Cultural resource impacts are evaluated in Section 4.5, *Cultural Resources*, of this EIR. Consistent with this measure, impacts to archaeological and historical resources are evaluated in accordance with CEQA. This EIR serves to comply with this policy.
Implementation Measure M. In areas of known paleontological resources, the County should address the preservation of these resources where feasible.	CONSISTENT. Paleontological resource impacts are evaluated in Section 4.7, *Geology and Soils*, of this EIR. MM 4.7-5 and MM 4.7-6, which would reduce potential impacts to known paleontological resources through hiring a qualified paleontologist shall be retained to monitor all ground-disturbing activity, document, and implement measures as needed.
Implementation Measure 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.	CONSISTENT. Tribal Cultural resource impacts are evaluated in Section 4.18, *Tribal Cultural Resources*, of this EIR. Consistent with this measure, notification regarding the proposed project was accomplished in accordance with AB52 and the established procedures for discretionary projects and CEQA documents in the County.
Implementation Measure 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.	CONSISTENT. Cultural resource impacts are evaluated in Section 4.5, *Cultural Resources,* of this EIR. This EIR serves to comply with this measure and includes MM 4.5-1 through MM 4.5-3, which would require consultation with the monitors or Native American monitor(s) and to conduct a Cultural Resources Sensitivity Training for all personnel working on the project

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
1.10.5 THREATENED AND ENDANGERED SPECIES	
Goal 1. Ensure that the County can accommodate anticipated future growth and development while a safe and healthful environment, and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.	CONSISTENT. As discussed in Section 4.4, *Biological Resources*, of this EIR, the project would potentially impact special-status plant and wildlife species. To preserve these valuable natural resources, the project would implement MM 4.4-1 through MM 4.4-11. Impacts to jurisdictional waters would be less than significant under the proposed project with implementation of MM 4.4-12 through MM 4.4-13. Those mitigation measures would require a Jurisdictional Delineation report (if applicable) and a Report of Waste Discharge with the RWQCB to obtain Waste Discharge Requirements (if applicable), and the Owner/operator shall also consult with California Department of Fish and Wildlife (CDFW) on the need for a streambed alteration agreement. See 1.3, Physical and Environmental Constraints, Goal 1 and Policy 9 and Policy 11 of the Kern County General Plan, above and Section 4.10, *Hydrology and Water Quality,* of this EIR. The project would be constructed in consideration of the floodplain and the Kern County General Plan, Floodplain Management Ordinance and MM 4.10-1. As discussed in Section 4.9, *Hazards and Hazardous Materials*, MM 4.9-1 through MM 4.9-2 would reduce hazards impacts and involve waste and debris management, preparation of a hazardous materials business plan, limitations on herbicide use, and contamination of subsurface materials. As discussed in Section 4.14, *Public Services*, of this EIR, implementation of MMs 4.14-1 through MM 4.14-4 would require the project to pay a fee assigned by the Kern County Planning and Natural Resources Department over the life of the proposed facilities in order to mitigate any potential impacts to fire or facilities, resulting from the project. The mitigation would take the form of: a CIC; allocation of sales and use taxes; and wherever feasible, require the project owner/operator to hire project employees from the local workforce. With implementation of these Mitigation Measures, the project would be consistent with this measure
Policy 27. Threatened or endangered plant and wildlife species should be protected in accordance with State and federal laws.	CONSISTENT. Biological resource impacts are evaluated in Section 4.4, *Biological Resources*, of this EIR. This EIR serves to comply with this policy and reduce potential impacts with mitigation. Additionally, the project would be developed and operated in accordance with all local, state and federal laws pertaining to the preservation of sensitive species.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Policy 28. County should work closely with State and federal agencies to assure that discretionary projects avoid or minimize impacts to fish, wildlife, and botanical resources.	CONSISTENT. Biological Resource impacts are evaluated in Section 4.4, *Biological Resources*, of this EIR. This EIR serves to comply with this policy and reduce potential impacts with mitigation. As part of the biological resources evaluation and habitat assessment conducted for the project, relevant state and federal agencies were contacted to ensure that appropriate information about the project site were being gathered. Specifically, an NOP of this EIR was sent to state and federal agencies requesting their input on the biological resource evaluation. Similarly, this EIR will also be circulated to these agencies, and staff will have the opportunity to comment on the biological resources evaluation. Therefore, the County is complying with this policy for the project.
Policy 29. The 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.	CONSISTENT. Biological resource impacts are evaluated in Section 4.4, *Biological Resources*, of this EIR. The project site is located within the Valley Region and is consistent with the applicable plans and policies related to preservation, mitigations, and reduction of impacts to biological resources. Accordingly, implementation of MM 4.4-1 through MM 4.4-15 would further increase cooperative efforts with local, State, and federal agencies to support threatened and endangered plant and wildlife
Policy 31. Under the provisions of the California Environmental Quality Act (CEQA), the County, as lead agency, will solicit comments from the California Department of Fish and Game and the U.S. Fish and Wildlife Service when an environmental document (Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report) is prepared.	CONSISTENT. See 1.10.5, Threatened and Endangered Species, Policy 27, 28, and 29, above.
Policy 32. Riparian areas will be managed in accordance with United States Army Corps of Engineers, and the California Department of Fish and Game rules and regulations to enhance the drainage, flood control, biological, recreational, and other beneficial uses while acknowledging existing land use patterns.	CONSISTENT. Biological resource impacts and impacts to riparian areas, are evaluated in Section 4.4, *Biological Resources*, of this EIR. The Biological Technical Resources Report found there are no perennial streams or riparian corridors that drain to the project site and there are no waters or wetlands of the United States and no riparian streams. The County will maintain open communication with all trustee and responsible agencies related to biological resources and will respond to all comments from reviewing agencies during the CEQA process.
Implementation Measure Q. Discretionary projects shall consider effects to biological resources as required by the California Environmental Quality Act.	CONSISTENT. Biological resource impacts are evaluated in Section 4.4, *Biological Resources*, of this EIR. Consistent with this measure, the evaluation of impacts to biological resources was performed in accordance with CEQA.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Implementation Measure R. Consult and consider the comments from responsible and trustee wildlife agencies when reviewing a discretionary project subject to the California Environmental Quality Act.	CONSISTENT. Biological resource impacts are evaluated in Section 4.4, *Biological Resources*, of this EIR. Consistent with this measure, the project would implement mitigation measures that require consultation with the California Department of Fish and Wildlife and US Fish and Wildlife. The County has and will respond to all comments from reviewing agencies during the CEQA process.
Implementation Measure S. Pursue the development and implementation of conservation programs with State and federal wildlife agencies for property owners desiring streamlined endangered species mitigation programs.	CONSISTENT. Biological resource impacts are evaluated in Section 4.4, *Biological Resources*, of this EIR. Consistent with this measure, the evaluation of impacts to biological resources was performed in accordance with CEQA.
1.10.6 SURFACE WATER AND GROUNDWATER	
Policy 34. Ensure that water quality standards are met for existing users and future development.	CONSISTENT. Water quality impacts are evaluated in Section 4.10, *Hydrology and Water Quality*, of this EIR. Consistent with this policy, the project would implement best management practices during construction to avoid impacts to water quality. The project would also implement a Hazardous Materials Business Plan to reduce mixing of pollutants with stormwater onsite, thereby maintaining the integrity of the watershed. In addition, per MM 4.10-1 in Section 4.10, *Hydrology and Water Quality*, of this EIR, the project would be required to implement a SWPPP, which would include BMPs designed to prevent the occurrence of soil erosion and discharge of other construction-related pollutants that could contaminate water quality and would be applicable to all areas of the project. In addition, prior to the commencement of construction activities, the project proponent would be required to adhere to the requirements of the Kern County Grading Code. This includes implementation of various measures designed to prevent erosion and control drainage onsite, thereby further preventing the potential sedimentation and subsequent degradation of stormwater.
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.	CONSISTENT. As discussed in Section 4.10, *Hydrology and Water Quality*, the project does not impact the County's ability to develop its groundwater supply. However, because project construction would cause more than 1 acre of ground disturbance, applicable Mitigation Measures apply. The project would implement MM 4.10-1 through MM 4.10-3 requiring a SWPPP to prevent the occurrence of soil erosion and discharge of other construction-related pollutants that could contaminate water quality within any areas of the project. Per MM 4.10-4 and MM 4.10-5, the Underground Injection Control program would prevent discharge into any underground source of current or future beneficial use groundwater. Injection of CO_2 into the ground via injection well would not mix with or contaminate

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
	groundwater. Therefore, operation of the project would not violate water quality standards, waste discharge requirements, or degrade surface or water quality in the area
Policy 41. Review development proposals to ensure adequate water is available to accommodate projected growth.	CONSISTENT. Public utility impacts are evaluated in Section 4.19, *Utilities and Service Systems,* of the EIR. As described therein, the project would have less-than-significant impacts on water supplies. However, the project has the potential to adversely affect groundwater or reclaimed water reserve if the project in the future demands more water than is available. The project would implement MM 4.19-1 to ensure that any groundwater or reclaimed water used is accounted for and regulated.
Policy 43. Drainage shall conform to the Kern County Development Standards and the Grading Ordinance.	CONSISTENT. See 1.9, Resources, Policy 11, above
Policy 44. Discretionary projects shall analyze watershed impacts and mitigate for construction-related and urban pollutants, as well as alterations of flow patterns and introduction of impervious surfaces as required by the California Environmental Quality Act (CEQA), to prevent the degradation of the watershed to the extent practical.	CONSISTENT. Water quality impacts are evaluated in Section 4.10, *Hydrology and Water Quality*, of this EIR. Consistent with this measure, construction-related impacts related to alteration of flow patterns and impervious surfaces would be less than significant. In addition, the project would be required to submit a drainage plan to the County for review and would implement MM 4.10-2, which requires a final hydrologic study and drainage plan designed to evaluate and minimize potential increases in runoff from the project site
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 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.	CONSISTENT. The applicant would be required to comply with mitigation measures that encourage groundwater resource management.
Implementation Measure Y. Promote efficient water use by utilizing measures such as: Requiring water-conserving design and equipment in new construction. Encouraging water-conserving landscaping and irrigation methods.	CONSISTENT. Public Utility impacts are discussed in Section 4.19, *Utilities and Service Systems*, of the EIR. As discussed therein, the project would require water for dust suppression, fire protection, and pipeline hydrotesting. Water usage during construction, primarily for dust-suppression purposes, is not anticipated to exceed 75 acre-feet over the 18-month construction phase. The water would be trucked and stored on-site and would not substantially decrease groundwater supplies within the Subbasin.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
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.	CONSISTENT. Aesthetic impacts are evaluated in Section 4.1, *Aesthetics*, of this EIR. This EIR serves to comply with this policy and reduce potential impacts through implementation of mitigation measures. MM 4.1-5 would require compliance with the Dark Skies Ordinance (Chapter 19.81 of the Kern County Zoning Ordinance) and would result in the minimum illumination needed to achieve safety and security objectives.
Policy 48. Encourage the use of low-glare lighting to minimize nighttime glare effects on neighboring properties.	CONSISTENT. See 1.10.7, Light and Glare, Policy 47, above.
Implementation Measure AA. The County shall utilize CEQA Guidelines and the provisions of the Zoning Ordinance to minimize the impacts of light and glare on adjacent properties and in rural undeveloped areas.	CONSISTENT. See 1.10.7, Light and Glare, Policy 47, above.
CHAPTER 2. CIRCULATION ELEMENT	
Objective 1. To make certain that transportation facilities needed to support development are available. To ensure that these facilities occur in a timely manner so as to avoid traffic degradation.	CONSISTENT. As described in Section 4.17, *Transportation and Traffic,* construction and operation of the project would not disrupt normal traffic flows or otherwise conflict with the County's roadway performance policies and programs. The project is located in a rural area and the amount of peak hour trips for both construction and operation would be generally less than 50 trips, and no more than 52 trips. Therefore, the project would not conflict with Circulation Element Objective 1.
Objective 5. Maintain a minimum Level Of Service (LOS) D for all roads throughout the County.	CONSISTENT. As described in Section 4.17, *Transportation and Traffic*, a Traffic Impact Analysis (TIA) was not warranted for the project due to the limited amount of peak hour trips during construction and operation of the project. The project is located in a rural area and the amount of peak hour trips for both construction and operation would be generally less than 50 trips, and no more than 52 trips. Therefore, construction and operation phases of the project are not expected to cause any operational Level of Service (LOS) impacts to the adjacent roadway facilities.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
2.3.3 HIGHWAY PLAN	
Goal 5. Maintain a minimum Level of Service (LOS) D.	CONSISTENT. As described in Section 4.17, *Transportation and Traffic*, a Traffic Impact Analysis (TIA) was not warranted for the project due to the limited amount of peak hour trips during construction and operation of the project. The amount of peak hour trips for both construction and operation would be generally less than 50 trips, and no more than 52 trips. Therefore, construction and operation phases of the project would not exceed a minimum LOS D, maintaining consistency with Goal 5.
Implementation Measure B. Continuity and integrity of the arterial and collector system at the mountain/valley region and the mountain/desert region boundary must be reviewed and approved in conjunction with project adoption on an individual basis.	CONSISTENT. The project boundary includes most of the San Joaquin Valley Floor portion of Kern County up to an elevation of 2,000 feet. The mountain/valley region and mountain/desert region interface area is outside the boundary of the project. Therefore, the project does not conflict with Circulation Element Implementation Measure B.
Implementation Measure C. Conformance to alignment minimum design standards, where roadways that deviate from section and mid-section lines intersect those lines, must be reviewed and approved in conjunction with project adoption on an individual basis.	CONSISTENT. As described in Section 4.17, *Transportation and Traffic*, no roadway improvements are required to serve construction or operation of the project.
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. 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 off-site transportation facilities. These enhancements would reduce traffic congestion to an acceptable level.	CONSISTENT. As discussed in Section 4.17, *Transportation and Traffic*, additional analysis and monitoring is not warranted for the project due to the limited amount of peak hour trips during construction and operation of the project. Likewise, construction and operation vehicle miles traveled (VMT) would not affect traffic characteristics in this part of Kern County or elsewhere and would not cause affected roadways to fall below LOS D. Therefore, the project is consistent with Future Growth Policy 2.
Policy 4. As a condition of private development approval, developers shall build roads needed to access the existing road network. Developers shall build these roads to County standards unless improvements along State routes are necessary then roads shall be built to Caltrans standards. Developers shall locate these roads (width to be determined by the Circulation Plan) along centerlines shown on the circulation diagram map unless otherwise authorized by an approved Specific Plan Line.	CONSISTENT. As described in Section 4.17, *Transportation and Traffic*, transportation requirements of the project during both construction and operation are limited. Regional access to the project site would be obtained via the existing highways and two-lane roads that traverse Elk Hills as shown in Chapter 3.0, *Project Description*, Figure 3-1. The project would not necessitate the

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Developers may build local roads along lines other than those on the circulation diagram map. Developers would negotiate necessary easements to allow this.	development of additional roadway systems for project development and is therefore consistent with Future Growth Policy 4.
Implementation Measure C. project development shall comply with the requirements of the Kern County Zoning Ordinance, Land Division Ordinance, and Development Standards.	CONSISTENT. With approval of a CUP, the project would comply with the County zoning ordinance. No variances or deviations are requested as part of the project. The project would conform to all applicable development standards.
2.5 OTHER MODES	
2.5.4 TRANSPORTATION OF HAZARDOUS MATERIALS	
Goal 1. Reduce risk to public health from transportation of hazardous materials.	CONSISTENT. Hazardous Materials Transportation and existing regulatory requirements of the California Vehicle Code that pertain to transport of hazardous materials and wastes are discussed in Section 4.9, *Hazards and Hazardous Materials*, of this EIR.
Policy 1. The commercial transportation of hazardous material, identification and designation of appropriate shipping routes will be in conformance with the adopted Kern County and Incorporated Cities Hazardous Waste Management Plan.	CONSISTENT. See 2.5.4, Transportation of Hazardous Materials, Goal 1, above.
Policy 2. Kern County and affected cities should reduce use of County-maintained roads and city-maintained streets for transportation of hazardous materials.	CONSISTENT. See 2.5.4, Transportation of Hazardous Materials, Goal 1, above.
Implementation Measure A. Roads and highways utilized for commercial shipping of hazardous waste destined for disposal will be designated as such pursuant to Vehicle Code Sections 31303 et seq. Permit applications shall identify commercial shipping routes they propose to utilize for particular waste streams.	CONSISTENT. See 2.5.4, Transportation of Hazardous Materials, Goal 1, above.
CHAPTER 3. NOISE ELEMENT	
3.2 NOISE SENSITIVE AREAS	
Goal 1. Ensure that residents of Kern County are protected from excessive noise and that moderate levels of noise are maintained.	CONSISTENT. Noise impacts, sensitive receptors, and County noise thresholds are evaluated in Section 4.13, *Noise*, of this EIR. As discussed in that section, the project would not cause significant impacts to sensitive receptors. Thus, the project would be consistent with this goal.
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.	CONSISTENT. The land uses proposed by the project are evaluated in Section 4.13, *Noise*, of this EIR. As discussed in this section, the project would be consistent with existing land use designations of the project site.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
Policy 1. Review discretionary industrial, commercial, or other noise-generating land use projects for compatibility with nearby noise-sensitive land uses.	CONSISTENT. See 3.3, Sensitive Noise Areas, Goal 1, above.
Policy 2. Require noise level criteria applied to all categories of land uses to be consistent with the recommendations of the California Division of Occupational Safety and Health (DOSH).	CONSISTENT. See 3.3, Sensitive Noise Areas, Goal 1, above.
Policy 3. Encourage vegetation and landscaping along roadways and adjacent to other noise sources to increase absorption of noise.	CONSISTENT. See 3.3, Sensitive Noise Areas, Goal 1, above. Consistent with this policy the project would be encouraged to provide vegetation and landscaping along roadways and adjacent to other noise sources to increase absorption of noise. However, as noted in Section 4.13, *Noise*, of this EIR, noise levels above 65 dBA exterior (L_{dn}) were only identified from the extract drill rigs used for drilling activities. However, the closest residential sensitive receptors to the project area would be at setback distances of two miles or greater. At a setback distance of two miles, noise levels associated with the drill rig would be approximately 47 dB L_{dn}. Noise levels above 65 dBA exterior (L_{dn}) were not identified from any other stationary source on the project site. Therefore, the project is consistent with Safety and Health Policy 3.
Policy 4. Utilize good land use planning principles to reduce conflicts related to noise emissions.	CONSISTENT. See 3.3, Sensitive Noise Areas, Goal 2, above. Noise-sensitive land uses are evaluated in Section 4.13, *Noise*, of this EIR.
Policy 7. Employ the best available methods of noise control.	CONSISTENT. See 3.3, Sensitive Noise Areas, Goal 1, above.
Implementation Measure A. Utilize zoning regulations to assist in achieving noise-compatible land use patterns.	CONSISTENT. The land uses proposed by the project are evaluated in Section 4.13, *Noise*, of this EIR. As discussed in this section, the project would be consistent with the land use and zoning designations of the project site.
Implementation Measure J. Develop implementation procedures to ensure that requirements imposed pursuant to the findings of an acoustical analysis are conducted as part of the project permitting process.	CONSISTENT. As discussed in Section 4.13, *Noise*, of this EIR, construction and operational noise levels would not generate a substantial increase in ambient noise levels. However, although there are no sensitive receptors close to the project area, there is still the potential for future single-family dwelling units to occur near the project area by right per the zoning allowances. To ensure no future sensitive receptors would be impacted by the proposed project, MM 4.13-1 would be implemented requiring the project proponent to provide substantial noise information prior to obtaining any grading or construction permit. Therefore, the project is consistent with Safety and Health Implementation Measure J.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
CHAPTER 4. SAFETY ELEMENT	
Goal 1. Minimize injuries and loss of life and reduce property damage.	CONSISTENT. Consistent with this goal, the project would be required to comply with adopted safety regulations, such as the County Fire Code, and related policies in the General Plan.
4.2 GENERAL POLICIES AND IMPLEMENTATION MEASURE, WHICH 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 oilfield areas, presently under way by various County departments, be continued.	CONSISTENT. The project does not interfere with County-wide programs related to identification, mapping, and evaluation of geologic, fire, flood safety hazard areas, and hydrogen sulfide concentrations in oilfield areas. The programs would continue regardless of the approval of the project.
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 land use activity susceptible to such hazards.	CONSISTENT. Section 4.7, *Geology and Soils*, of this EIR, discusses potential geologic hazards, Section 4.10, *Hydrology and Water Quality*, of this EIR, discusses potential flood hazards, and Section 4.20, *Wildfire*, of this EIR discusses potential fire hazards as a result of project implementation. Consistent with this measure, all hazards have been considered as part of this analysis.
Implementation Measure F. The adopted multi-jurisdictional Kern County, California Multi- Hazard Mitigation Plan, as approved by FEMA, shall be used as a source document for preparation of environmental documents pursuant to CEQA, evaluation of project proposals, formulation of potential mitigation, and identification of specific actions that could, if implemented, mitigate impacts from future disasters and other threats to public safety.	CONSISTENT. As discussed in Section 4.9, *Hazards and Hazardous Materials*, of this EIR, the Kern Multi-Jurisdictional Hazard Mitigation Plan has characterized the agricultural floor of the San Juaquin Valley as an area of very high fire severity risk. Although the project site is not located within a high fire hazard severity zone, construction and operational activities could increase the potential for wildland fires. Therefore, wildfire impacts would be potentially significant and require implementation of measures requiring the project proponent to comply with Kern County Fire Codes and limit use of fire sensitive electrical equipment.
4.3 SEISMICALLY INDUCED SURFACE RUPTURE, GROUND SHAKING, AND GROUND FAILURE	
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.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Measure D, of the Kern County General Plan, above.
Implementation Measure C. The fault zones designated in 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.	CONSISTENT. See 1.3, Physical and Environmental Constraints, Goal 1, of the Kern County General Plan, above. Consistent with this policy, the project would not include development for human occupancy, and would not be located near an active earthquake fault.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
4.5 LANDSLIDES, SUBSIDENCE, SEICHE, AND LIQUEFACTION	
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.	CONSISTENT. Liquefaction potential is discussed in Section 4.7, *Geology and Soils*, of this EIR. The project would implement MM 4.7-1, which would require the project to submit an engineering design specific geotechnical study to the Kern County Public Works Department in order to obtain required grading permits. MM 4.7-1 would address potential soil stability impacts and prescribe specific design requirements to address these potential impacts related to unstable soils that could lead to liquefaction. Therefore, with implementation of this mitigation measure, the project would be consistent with this goal to avoid impacts related to seismically-induced liquefaction.
Policy 3. Reduce potential for exposure of residential, commercial, and industrial development to hazards of landslide, land subsidence, liquefaction, and erosion.	CONSISTENT. As discussed in Section 4.7, *Geology and Soils*, of this EIR, conditions for landslides are also not present at the site which is characterized by relatively gradual inclines across the site. Grading would be subject to compliance with the NPDES General Construction Permit requirements and site-specific measures would be incorporated into the SWPPP as required by MM 4.10-1 as discussed in Section 4.10, *Hydrology and Water Quality*, of this EIR. The implementation of required BMPs would have the ability to minimize the potential for erosion or loss of topsoil. Implementation of MM 4.7-1, which includes adherence to the requirements of applicable building codes and earthquake safe design standards), would ensure that effects from seismic-related ground failure including liquefaction would be minimized. In addition, with regard to erosion, as discussed in Section 4.10, *Hydrology and Water Quality*, of this EIR, the project would implement MM 4.10-2, which requires the completion of a hydrologic study and final drainage plan for the project prior to the issuance of a grading permit. This would serve to reduce any impacts related to erosion, consistent with this policy.
4.6 WILDLAND AND URBAN FIRE	
Policy 1. Require discretionary projects to assess impacts on emergency services and facilities.	CONSISTENT. Consistent with this policy, impacts on emergency services and facilities are discussed and evaluated in Section 4.9, *Hazards and Hazardous Materials*, of this EIR. The project would implement MM 4.9-19, which would require preparation and implementation of a fire safety plan to ensure the provision of appropriate access. Additionally, per Section 4.15, *Public Services*, of this EIR, the project would also implement MM 4.15-4 to ensure that the cost of emergency preparation in the event of CO_2 release is fully funded and MM 4.15-5 to ensure

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
	that all requirements, including payments, have been met prior to final closure of the facility.
Policy 3. The County will encourage the promotion of fire prevention methods to reduce service protection costs and costs to taxpayers.	CONSISTENT. The project would not interfere or prohibit the County's ability to meet this policy. MM 4.9-19 requires the proponent to develop a fire safety plan for use during construction and operational activities. All onsite employees would be trained on fire safety and how to respond to onsite fires, should they occur. See Sections 4.9, *Hazards and Hazardous Materials*, 4.15, *Public Services*, and 4.20, *Wildfire*, of this EIR.
Policy 4. Ensure that new development of properties have sufficient access for emergency vehicles and for the evacuation of residents.	CONSISTENT. Consistent with this policy, Section 4.15, *Transportation*, of this EIR includes MM 4.15-1, which would require the approval of a Construction Traffic Control Plan, encroachments and or other necessary permits by Caltrans and/or the Kern County Roads Dept. The project proponent. would also develop and implement a fire safety plan for use during construction and operation.
Policy 6. All discretionary projects shall comply with the adopted Fire Code and the requirements of the Fire Department.	CONSISTENT. Consistent with this policy, Section 4.9, *Hazards and Hazardous Materials*, of this EIR includes MM 4.9-19, which requires the proponent to develop a fire safety plan for use during construction and operational activities. The project would be required to comply with the adopted Fire Code and the requirements of the Kern County 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.	CONSISTENT. Consistent with this measure, the proposed project would implement MM 4.9-19, which would require preparation and implementation of a fire safety plan to ensure the provision of appropriate access. The project would implement MM 4.15-4 to ensure that the cost of emergency preparation in the event of CO_2 release is fully funded and MM 4.15-5 to ensure that all requirements, including payments, have been met prior to final closure of the facility.
4.9 HAZARDOUS MATERIALS	
Implementation Measure A. Facilities used to manufacture, store, and use of hazardous materials shall comply with the Uniform Fire Code, with requirements for siting or design to prevent on-site hazards from affecting surrounding communities in the event of inundation.	CONSISTENT. See 4.6, Wildland and Urban Fire, Policy 6, above.

Table 4-11-4: Project Consistency with Local Planning Documents

Goals and Policies	Project Consistency
CHAPTER 5. ENERGY ELEMENT	
5.3.2 KERN COUNTY'S ECONOMIC DEPENDENCE ON THE OIL MARKETPLACE	
Policy 3. The County shall encourage the conversion of existing petroleum-related facilities to other productive uses when they are no longer needed or productive.	CONSISTENT. The project does include the conversion of oil and gas facilities.
Policy 4. The County should encourage the development of renewable energy industries to diversify the energy economy in Kern County.	CONSISTENT. MM 4. 11-1 allows conditional use of the surface for commercial scale solar, thereby encouraging renewable energy .

Key:
BMP = best management practice
CCS = carbon capture and storage
CDFW = California Department of Fish and Wildlife
CEQA = California Environmental Quality Act
CIC = Cumulative Impact Charge
CO_2 = carbon dioxide
CUP = Conditional Use Permit
dBA = A-weighted decibels
DOC = California Department of Conservation
EIR = Environmental Impact Report
L_{dn} = average day/night sound
LOS = level of service
MM = Mitigation Measure
MRZ = Mineral Resource Zone
NOP = Notice of Preparation
NPDES = National Pollutant Discharge Elimination System
SWPPP = Storm Water Pollution Prevention Plan
VMT = vehicle miles traveled

The processing and consideration of a CUP and zoning for consistency provides for a review and evaluation of the compatibility of the underground storage project with surrounding communities. The project activities occur in localized areas. However, there is a much larger area of surface land over the top of the CO_2 storage with no activities related to the storage. This presents conformality issues for the CUP. Kern County does not permit multiple site plans or CUPs for activities on the exact same piece of a property. Such a policy would result in confusion for the public and possible legal situations of conflicts between investors and owners. All contemplated activities must be included in the CUP project description even if they require further environmental review before approval. In addition, while the injection of CO_2 under a building or facility at of 3,000 feet deep or more may be safe based on science modeling, policy determinations at this time will be conservative and not support that type of land use. Identified uses that can be proposed on the CCS Land Use Area inside the CUP boundary are limited to commercial scale solar and energy storage for electricity (MM 4.11-1), conservation easements (MM 4.11-2), agricultural cultivation only (MM 4.2-1) and existing oil and gas operations but not EOR. EOR in association with the collection of CO_2 with this project is prohibited by state law. Each of these uses are described and restricted by each specific mitigation to ensure the operator understands the limitations on the surface site and complies with all applicable requirements of the EIR. Of specific concern is any activity that would drill wells or other shafts that could penetrate the capstone of the carbon capture area or disturb the wildlife protective buffer around the injection wells. Commercial scale or accessory solar and energy storage for electricity requires modification of the CUP and additional review under CEQA before any decision for approval or denial.

MM 4.11-3 requires the Kern County Planning and Natural Resources Department to put a notification on every Assessor Parcel within the CUP boundary in the Kern County Building Department Permitting Portal (Accela) so that appropriate review for restrictions of any permit can be done before issuance. MM 4.11-4 and MM 4.11-6 provide procedures for making the boundary of the CCS surface area larger or smaller after approval. MM 4.11-5 incorporates requirements from Senate Bill (SB) 905 for notification of adjacent property owners and communities that injection will begin, as well as deed and injection schedule notification restrictions.

Chapter 3, *Project Description*, Section 3.4.1, *Future Sources Identification*, provides the assumptions used for analysis for the source of CO_2 for the project. As discussed, only one source is currently identified and covered by this EIR: oilfield gas from specific Elk Hills locations. All future sources for CO_2 for injection will be limited by geographic location, specific types of industries, and environmental review before it can be approved to be injected into the project.

MM 4.11-7 limits future project sources to the following parameters:

- Location only within Kern County
- Hydrogen – green and blue
- Biomass carbon removal and storage (BiCRS)
- Cement production
- Green steel production

- Oilfield field gas streams
- Power plants
- Direct air capture
- Alternative fuel production
- Industrial use is approved in an appropriately zoned parcel with CO_2 capture and transport requiring an additional CUP and EIR for compliance with CEQA for unincorporated Kern County.
- All CO_2 pipelines require a CUP and EIR for compliance with CEQA.
- CO_2 from a source in an incorporated city in Kern County must show compliance with the preparation of an environmental document, with Kern County as a responsible agency and not an exemption from CEQA review.
- Prior to injection of any approved CO_2, compliance with all applicable State and federal EPA permit conditions must be met.

MM 4. 11-1 through MM 4.11-7 will provide additional protections, notification for surrounding property owners, and full review of all future sources for compliance with the Zoning Ordinance, General Plan, and CEQA. With these measures, as well as those in Section 4.15, *Public Services*, the impacts to Land Use and Planning are less than significant.

Mitigation Measures

MM 4.11 -1 Any proposed use of any portion of the CCS Surface Land Area for solar or energy storage for electricity for any use onsite or offsite will require a Conditional Use Permit and evaluation of the project under the California Environmental Quality Act (CEQA). Any application submitted to the Kern County Planning and Natural Resources Department for any type of solar or energy storage shall include a written acknowledgement that the solar or energy storage Owner/operator is aware that if approved, the CUP will have site specific restrictions and conditions for operation related to the location as part of the CCS Surface Land Area. Any such project would include, but not be limited to, the following mitigation measures:

A. No activities are being authorized for use of the area that would involve drilling of any water wells or other exploratory activities that would penetrate the confined cap layer as restricted by the approved CCS CUP.

B. No use of the buffer area around the injection well sites is included in any construction activity.

C. Written acknowledgement that solar owner, contractor and/or operator has been informed and has a binding agreement to not conduct any activities near or in proximity to either the injection well sites or the capture facilities that would damage the fencing or equipment.

D. The solar or energy storage project shall include a Worker Awareness Program for all contractors and employees of the use that the project is within the area for the underground storage of CO_2.

E. That the project is bound by all applicable requirements of the Carbon TerraVault 1 (Kern County) CUP and EIR Mitigation Monitoring and Reporting Plan.

MM 4.11-2 Use of the CCS Surface Land Area is restricted to Agricultural Cultivation (MM 4.10-1), Solar and Energy Storage (MM 4.10-1), Conservation (MM 4.10-6) and oil and gas exploration and production with appropriate permits. All other uses are prohibited.

MM 4.11-3 The Kern County Building Department Permitting Portal (Accela) shall have a notation in each individual Assessor Parcel Numbers (APN) that is included in the CCS Surface Land Area of the following:

> **"***This Parcel is included in the approved Carbon Capture and Storage Conditional Use Permit (Carbon Terra Vault 1, [Kern County] by California Resources Corporation). Uses are specifically limited to only the approved Carbon Capture and Storage project, agricultural cultivation, conservation and permitted oilfield activities. No building permits can be issued without specific review and approval from the Kern County Planning and Natural Resources Department for any use."*

MM 4.11-4 No Lot Line Adjustment may be made that adds land to any parcels included in the CCS Surface Land Area without a formal modification of the CUP at a hearing and review under CEQA. Any recorded Lot Line Adjustment to reduce the size of the CCS Surface Land Area to conform to the Approved Area of Review or reduce the parcel used for monitoring or seismic wells may be done administratively by submitting a CUP site plan map with the reduced CCS Surface Land Area shown and notation of the new parcels that are included in the CUP boundary but will be outside the CCS Surface Land Area.

MM 4.11-5 Prior to any grading or building or construction, a deed restriction notification document shall be recorded by the applicant with language as approved by the Kern County Planning and Natural Resources Department that gives constructive notice that the CCS Surface Land Area, described by both APNS and legal description, is an approved Carbon Capture and Storage project subject to a Conditional Use Permit and related Environmental Impact Report. The document shall be recordable and provide information for access to the following information that shall be updated quarterly, or as applicable:

A. Names of operator of CCS facility and physical address of headquarters and email, dates of injection, quantity of injections, and specific injection zone or zones.

B. The recorded conservation easement on the 640 acres of APN 157-060-02 shall be acknowledged in the notification document as superseding any restrictions of the approved CUP and related EIR.

C. Sixty (60) days before commencing the first injection of CO_2, the applicant hall provide written notice to all owners (surface and mineral) within the CUP boundary and all adjacent property owners (surface and mineral) by certified mail. The notice shall be reviewed and approved, before mailing by the applicant, by the Kern County Planning and Natural Resources Department.

MM 4.11-6 If the EPA reports, based on the monitoring evidence, that the approved Area of Review for the underground CCS storage has expanded outside the boundaries of the CCS Surface Land Area, a formal modification of the CUP boundary shall be made at a noticed public hearing at the Kern County Board of Supervisors and all applicable mitigation measures implemented**.**

MM 4.11-7 All CO^2 injected into Carbon TerraVault I (CTV I) must comply with the following criteria. Written evidence of such compliance shall be submitted to the Kern County Planning and Natural Resources Department for review and approval.

A. Source of CO_2 must be from an industry within Kern County.

B. Only the following industries may send captured CO_2 for injection to CTV I.

1. Hydrogen – Green
2. Hydrogen – Blue
3. Biomass Carbon Removal and Storage (BiCRS)
4. Cement production
5. Green Steel production
6. Oilfield field gas streams
7. Power Plants
8. Direct Air Capture
9. Alternative Fuel production

C. The source of the captured CO_2 must comply with the following conditions:

1. Projects within unincorporated Kern County: the listed use is approved in an appropriately zoned parcel with CO_2 capture and transport requiring an additional Conditional Use Permit and Environmental Impact Report for compliance with CEQA.

2. Projects within an incorporated City in Kern County: the listed use has capture technology for CO_2 that shows compliance with the preparation of an environmental document, with Kern County as a Responsible Agency and not the use of an exemption from CEQA review.
3. All CO_2 pipelines for transport from offsite sources that traverse unincorporated Kern County land require a Conditional Use Permit and Environmental Impact Report for compliance with CEQA. Any CO_2 pipelines that are permitted by the California Public Utilities Commission for a common carrier company that requests to connect to CTV I for injection are not covered by this EIR and either (a) must comply with a CUP and EIR by Kern County before injection can commence into CTV I, or (b) Kern County has participated in the CPUC process and reasonable and feasible mitigation for protection of Kern County communities has been included.
4. The injected CO_2 from an approved source is in full compliance with all requirements of State law and the federal EPA permit.

Level of Significance After Mitigation

Impacts would be less than significant.

4.11.5 Cumulative Setting, Impacts, and Mitigation Measures

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development, including wells and abandonment activity to implement CCS projects, constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells, and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year countywide of various types (production, water disposal, water flood injectors,

idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021), and an additional 5,066 other wells (cyclic wells, SB 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division permitting for all wells, except for plugging and abandonments, has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to land use and planning resources is considered the western section of Kern County near the floor of the San Joaquin Valley. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on land use and planning resources. This geographic scope of analysis is appropriate because the land use and planning resources within this area are expected to be similar to those in the project site because of their proximity.

Impact 4.11-3: Contribute to Cumulative Land Use and Planning Resource Impacts

With regard to impacts to land use and planning resources, the project does not have the potential to contribute significantly to cumulative impacts within the County. A complete analysis of the cumulative impacts to land use and planning resources from oil and gas operations are provided in Section 4.10, *Land Use and Planning* of the Oil and Gas EIR. With regard to cumulative effects of the project, together with other projects resulting in a physical divide of an established community (Impact 4.10-1), the project's impact would be minimal because there are no established residential communities in the project area. The project's contribution to any cumulative land use and planning impact would not be cumulatively considerable. With regard to Impact 4.11-2, and 4.11-3, MM 4.11-1 through MM 4.11-6 as well as MM 4.15-1 though MM 4.15-2 (see Section 4.15, *Public Services*) provide compatible with plans and policies of Kern County and surrounding communities. The cumulative impacts are, therefore, less than significant.

Mitigation Measures

Implement MM 4.11-1 through MM 4.11-6, as described above, and MM 4.15-1 and MM 4.15-2, as described in Section 4.15, *Public Services*.

Level of Significance After Mitigation

Cumulative impacts would be less than significant.

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Section 4.12

Mineral Resources

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Section 4.12

Mineral Resources

4.12.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for mineral resources. It also describes the impacts on mineral resources that would result from implementation of the proposed Carbon TerraVault I (Kern County) Project (project) and mitigation measures that would reduce these impacts, if necessary. The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft and approximately 4 miles from the unincorporated community of Buttonwillow.

A description of the environmental setting (affected environment) for mineral resources is presented below in Section 4.12.2, *Environmental Setting*. The regulatory setting applicable to mineral resources is presented in Section 4.12.3, *Regulatory Setting*, and Section 4.12.4, *Impacts and Mitigation Measures*, discusses project impacts and associated mitigation measures.

State law defines "minerals" as "[a]ny naturally occurring chemical element or compound, or groups of elements and compounds, formed from inorganic processes and organic substances, including, but not limited to, coal, peat, and bituminous rock, but excluding geothermal resources, natural gas, and petroleum" (14 California Code of Regulations [CCR] § 3501). For purposes of this EIR, "minerals" are defined as also including oil and gas resources. Information used in the preparation of this section was sourced from the California Geological Survey and Kern County General Plan (KCGP).

4.12.2 Environmental Setting

Regional Setting

Kern County is California's third largest county, encompassing 8,202 square miles at the southern end of the Central Valley. The 9,104-acre project area is predominantly located in the Central Valley portion of the county in the San Joaquin Valley bounded by Kings and Tulare counties to the north, Santa Barbara and San Luis Obispo counties to the west, the Tehachapi Mountains and the Sierra Nevada ranges to the east, and the northern boundary of the Los Padres National Forest to the south.

Kern County is located within the Inland District of the Department of Conservation's California Geologic Energy Management Division (CalGEM) and is one of the richest oil-producing counties in the United States. The valley floor area of the County and the lower elevations of the surrounding mountain ranges contain numerous deposits of oil and gas resources, a major economic resource for the county.

Other mineral resources in Kern County include numerous mining operations that extract a variety of materials, including petroleum, natural gas, aggregate materials (sand and gravel), stone, gold, dimensional stone, limestone, clay, shale, gypsum, pumice, decorative rock, silica, and specialty sand.

Oil and Gas Resources

Kern County leads the state in oil and natural gas production. Kern County produced 71 percent of California's in-state oil in 2019 and about 78 percent of the state's total natural gas (KDEF 2021). Kern County's Elk Hills is the state's top natural gas producer. Kern County produced 119 million barrels of oil and 129 billion cubic feet of natural gas in 2019 (KDEF 2021).

Mineral and petroleum resources are a fundamental element of Kern County's employment base and overall economy. As new recovery technologies come into use, petroleum extraction should continue its economic importance. Even as California ramps up state laws to promote renewable energy resources and alternative transportation fuels, experts continue to recognize that oil and gas production will continue to be critical, and domestic oil and gas production remains a vital national interest.

Mineral Resource Zones

The Surface Mining and Reclamation Act of 1975 (SMARA) requires the State Geologist to classify land into Mineral Resource Zones (MRZs) according to its known or inferred mineral potential. The State Geologist has classified 2,971 square miles of land in Kern County as MRZs of varying significance. The designated MRZs in the project area are for aggregate resources, consisting of stone, sand, and gravel, generally suitable for use in building and road construction (CGS 2009), and are defined as follows:

- **MRZ-1**: Areas where available geologic information indicates that little likelihood exists for the presence of significant mineral resources.
- **MRZ-2**: Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists. This zone shall be applied to known mineral deposits or where well-developed lines of reasoning based upon economic-geologic principles and adequate data demonstrate that the likelihood for occurrence of significant mineral deposits is high.
  - **MRZ-2a**: Areas underlain by mineral deposits where geologic data indicate that significant measured or indicated resources are present. Areas classified MRZ-2a contain discovered mineral deposits that are either measured or indicated reserves. Land included in MRZ-2a is of prime importance because it contains known economic mineral deposits.
  - **MRZ-2b**: Areas underlain by mineral deposits where geologic information indicates that significant inferred resources are present. Areas classified MRZ-2b contain inferred mineral resources as determined by their lateral extension from

proven deposits or their similarity to proven deposits. Further exploration could result in upgrading areas classified MRZ-2b to MRZ-2a.

- **MRZ-3:** Areas containing known or inferred mineral occurrences of undetermined mineral resource significance (CGS 2009)
  - **MRZ-3a**: Areas containing known mineral occurrences of undetermined economic significance. Further exploration could result in reclassification of all or part of these areas into the MRZ-2a or MRZ-2b categories.
  - **MRZ-3b**: Areas containing inferred mineral occurrences of undetermined economic significance. Further exploration could result in the reclassification of all or part of these areas into the MRZ-2a or MRZ-2b categories.
- **MRZ-4**: Areas containing no known mineral occurrence

Local Setting

According to the Updated Mineral Land Classification Map for Portland Cement Concrete-Grade Aggregate in the Bakersfield Production-Consumption Region, Kern County, California (CGS 2009), Elk Hills is designated MRZ-3, containing known or inferred mineral occurrences of undetermined mineral resource significance.

Aggregate Mines

According to a database search of active mines listed in the California Department of Conservation, Division of Mine Reclamation (DMR) database, there are no active or newly permitted (and presumed to be active in the near future) aggregate materials mines in the project area (DMR 2023). The nearest mapped mine is approximately two miles northeast of the site and is indicated to be an open pit with a primary product of sand and gravel.

Other Mineral Resources

According to a search of the DMR database, there are no active mines in the project area producing either shale, diatomite, clay, or gypsum (DMR 2023).

4.12.3 Regulatory Setting

State

Surface Mining and Reclamation Act of 1975

SMARA was enacted to identify and protect mineral resources of statewide or regional significance and ensure that those resources are available when needed. SMARA 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.

California Department of Conservation Geologic Energy Management Division

CalGEM is a state agency responsible for supervising the drilling, operation, maintenance, plugging, and abandonment of oil, gas, and geothermal wells. CalGEM's regulatory program promotes the wise 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. CalGEM oversees well operations and regulates the production of oil and gas, as well as geothermal resources, within the State of California, pursuant to CCR, Title 14, Division 2, Chapter 4, which includes well design and construction standards, surface production equipment and pipeline requirements, and well abandonment procedures and guidelines.

Surface Mining and Reclamation Act of 1975 - State Mining and Geology Board

Pursuant to SMARA, mineral lands are mapped with the California Mineral Land Classification System according to jurisdictional boundaries. All mineral commodities in the area, including aggregates, common clay, and dimensional stone, are mapped at one time. Priority is given to areas where future mineral resource extraction could be precluded by incompatible land uses or mineral resources are likely to be mined during the 50-year period following their classification. Detailed mineral land classification and designation reports provided by the State Mining and Geology Board (SMGB) are on file with the City of Bakersfield and Kern County. The SMGB also has adopted regulations (14 CCR 3500 et seq.) establishing state policy for reclamation of mined lands and conduct of surface mining operations.

The SMGB established MRZs to designate lands that contain mineral deposits. Accordingly, the MRZ classification system is used to evaluate an area's mineral resources pursuant to SMARA. A "resource" is a concentration of naturally occurring solid, liquid, or gaseous material in such form and amount that economic extraction of the commodity from the concentration is currently potentially feasible. A "reserve" is that part of the resource base that could be economically extracted or produced within the foreseeable future. For any given mineral resource, an area may be classified as MRZ-1, MRZ-2, MRZ-3, or MRZ-4, as noted previously.

As described in Section 4.12.2, *Environmental Setting*, the project area contains mineral resource areas classified as MRZ-3.

According to the SMGB, "Designation" is the process by which the SMGB determines that a particular classified mineral deposit is of regional, multi-community, or statewide economic significance. This process is facilitated through analyses by the State Geologist and the California Division of Mines and Geology (also known as the California Geological Survey, or CGS), and information gathered from local communities, the mining industry, and other governmental agencies, such as the Governor's Office of Planning and Research. The purpose of Designation is to identify those areas that are of prime importance in meeting future needs of the study region and that remain available from a land use perspective.

Designation is an effort to conserve mineral resources in regions of expected rapid urbanization or other land uses that might prevent surface mining activities, and therefore result in a loss of the mineral resource to the community. To avoid dictating to local communities where future aggregate mines should be located, mineral designated areas generally contain resources (un-permitted deposits) that are far in excess of the region's 50-year demand. This approach attempts to provide maximum flexibility to local governments in making land use decisions, while still conserving an adequate amount of construction aggregate for the future.

The objectives of these processes are to provide local agency decision makers with information on the location, need, and importance of mineral resources within their jurisdiction, and to require that this information be considered in local land use planning decisions. These objectives are met through the adoption of local Mineral Resource Management Policies that provide for the conservation and prudent development of these mineral deposits.

Local

Kern County General Plan

The project area is located within the Kern County General Plan (KCGP) area and, therefore, would be subject to applicable policies and measures of the KCGP. The Land Use, Conservation, and Open Space Element and the Energy Element of the KCGP include goals, policies, and implementation measures related to mineral resources that apply to the project, as described below.

The project site is not within a mineral recovery area; however, seven parcels are designated as "mineral and petroleum" land use, by the KCGP (see Chapter 3, *Project Description*). The "mineral and petroleum" land use designation is applied to "areas which contain producing or potentially productive petroleum fields, natural gas, and geothermal resources, and mineral deposits of regional and Statewide significance…Uses are limited to activities directly associated with the resource extraction. Uses shall include, but are not limited to, the following: Mineral and petroleum exploration and extraction, including aggregate extraction; extensive and intensive agriculture; mineral and petroleum processing (excluding petroleum refining); natural gas and geothermal resources; pipelines; power transmission facilities; communication facilities; equipment storage yards; and borrow pits."

Chapter 1. Land Use, Conservation, and Open Space Element

1.9. Resource

Goals

Goal 1. To contain new development within an area large enough to meet generous protections of foreseeable need, but in locations that will not impair the economic strength derived from the petroleum, agriculture, rangeland, or mineral resources or diminish the other amenities that exist in the County.

Goal 2. Protect areas of important mineral, petroleum, and agricultural resource potential for future use.

Goal 3. Ensure the development of resource areas to minimize effects on neighboring resource lands.

Policies

Policy 1. Appropriate resource uses of all types will be encouraged as desirable and consistent interim uses in undeveloped portions of the County regardless of General Plan designation.

Policy 14. Emphasize conservation and development of identified mineral deposits.

Policy 17. Lands classified as MRZ-2, as designated by the State of California, should be protected from encroachment of incompatible land uses.

Implementation Measures

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.

Implementation Measure I. Periodically review the Zoning Ordinance to reflect new technology and energy sources and encourage these types of uses for new development.

Chapter 5. Energy Element

5.2. Importance of Energy to Kern County

General Goal

To assert Kern County's position as California's leading energy provider, to encourage safe and orderly energy development within the County, including research and demonstration projects, and to become actively involved in the decisions and actions of other agencies as they affect energy development in Kern County.

Policies

Policy 5. The County shall work with other agencies to define regulatory responsibility concerning energy-related issues, and shall seek to eliminate, insofar as possible, duplicative regulations.

4.12.4 Impacts and Mitigation Measures

Methodology

Potential impacts of the project on mineral resources have been evaluated using a variety of sources, including a review of information from the California Department of Conservation, CGS, and Kern County publications and maps. Using the aforementioned resources and professional judgment,

impacts were analyzed according to California Environmental Quality Act (CEQA) significance criteria described in this subsection.

A list of the specific cited references is provided at the end of this resource section.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist state that a project would have a significant impact on mineral resources if it would

- 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 or
- 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.

Project Impacts

Impact 4.12-1: 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

Project activities could result in the temporary or permanent loss of availability of mineral resources if project development those resources could not be extracted, or if activities prevented access to mineral resources. As described above, the project site is located on lands designated as MRZ-3, where known or inferred mineral occurrences of undetermined mineral resource significance are present (CGS 2009). No mines were determined to be active within the project area.

Oil and gas in the Elk Hills oilfield reservoir is considered a mineral resource of value to the state and as identified in the KCGP. The state restriction on enhanced oil recovery in the carbon capture and storage (CCS) surface land area and area of review, as well as requirements to abandon over 200 wells, as regulated by the U.S. Environmental Protection Agency (EPA) Underground Injection Control (UIC) permit would result in a significant loss of oil and gas resources. The project would restrict oil and gas exploration and extraction on over 7000 acres in an established oilfield with known resources. Although this specific area of 7,000 acres is an exhausted reservoir, new technology could find deeper reserves if the area of review was not limited by implementation of the project. Therefore, implementation of the proposed project would result in the loss of availability of known mineral resources of oil and gas and the project would result in a significant and unavoidable impact. There are no feasible or reasonable measures that can legally be implemented to reduce the impacts on mineral resources.

Mitigation Measures

No mitigation measures.

Level of Significance

Impacts would be significant and unavoidable.

Impact 4.12-2: 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

The project would result in the loss of oil and gas resources that could reasonably be expected to be recovered. As discussed above, the loss of the existing oil reservoir due to the state restriction on enhanced oil recovery in the CCS surface land area and area of review is a significant loss of oil and gas. This oil and gas resource is considered a mineral of value to the state and an important resource to the Kern County economy, as identified in the KCGP. Therefore, the implementation of the proposed project would result in the significant loss of availability of a locally important mineral resource, and the project would result in a significant and unavoidable impact.

Mitigation Measures

No mitigation measures.

Level of Significance

Impacts would be significant and unavoidable.

4.12.5 Cumulative Setting Impacts and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The Oil and Gas EIR (including its supplemental documents) is subject to a pending court challenge. The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that are not disputed in the current litigation. The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year countywide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate Bill [SB] 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. CalGEM permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to mineral resources comprises the area of all CCS projects within the County. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on mineral resources. This geographic scope of analysis is appropriate because mineral resources impacts within CCS project areas are expected to be similar in that each would result a loss of oil extraction opportunities throughout the County.

Impact 4.12-3: Contribute to Cumulative Mineral Resources Impacts

With regard to impacts on mineral resources, the project has the potential to contribute significantly to cumulative impacts within the region. A complete analysis of the cumulative impacts to mineral resources from oil and gas activities are provided in the Section 4.11, *Mineral Resources*, of the Kern County Oil and Gas EIR.

The project could result in the loss of availability of local important mineral resources if activities prevented access to those resources. As previously discussed, the project is expected to result in a significant loss of oil and gas resources, which is considered a mineral of value to the state and County as identified in the KCGP. There are no feasible or reasonable measures that can legally be implemented to reduce the impacts on mineral resources.

The proposed project, in conjunction with other related projects, may result in the loss of availability of a known mineral resource or a locally important mineral resource recovery site and may contribute to cumulative impacts to mineral resources with all feasible and reasonable mitigation.

Mitigation Measures

No mitigation measures.

Level of Significance

Cumulative impacts would be significant and unavoidable.

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Section 4.13

Noise

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Section 4.13
Noise

4.13.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting regarding noise. It also evaluates existing noise conditions in the project area and analyzes the impacts on ambient noise and vibration levels that would result from implementation of the California Resources Corporation's (project proponent) proposed Carbon TerraVault I (Kern County) Project (project) and identifies mitigation measures that would reduce these impacts, if necessary. The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

The section is informed by the September 2023 Environmental Noise Assessment Report prepared by WJV Acoustics, Inc. (WJVA) (Appendix H) and the March 2023 project-related traffic data provided by Ruettgers & Schuler Civil Engineers (Appendix I) (Ruettgers & Schuler 2023).

A description of the environmental setting (affected environment) for noise is presented below in Section 4.13.2, *Environmental Setting*. The regulatory setting applicable to noise-related impacts is presented in Section 4.13.3, *Regulatory Setting*, and Section 4.13.4, *Impacts and Mitigation Measures,* discusses project impacts and associated mitigation measures.

Terminology

Ambient Noise: the composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately 5 decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and 10 decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

Decibel, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

DNL/L_{dn}: Day/night average sound level. The average equivalent sound level during a 24-hour day, obtained after addition of 10 decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent sound level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8, and 24-hour sample periods.

NOTE: The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while Leq represents the average noise exposure for a shorter time period, typically 1 hour.

L_{max}: The maximum noise level recorded during a noise event.

Ln: The sound level exceeded "n" percent of the time during a sample interval (L90, L50, L10, etc.). For example, L10 equals the level exceeded 10 percent of the time.

Noise Exposure Contours: Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

Noise Level Reduction (NLR): The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of a noise level reduction combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL: Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

Sound Transmission Class (STC): The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

The assessment of noise impacts uses specific terminology and fundamental descriptors not commonly used in everyday conversation. Therefore, to assist in a thorough understanding of the subsequent analysis, these terms are discussed in this subsection. Acoustics is the study of sound, and noise is defined as unwanted sound. Noise is a complex sound produced by various vibrations, often diffused and not harmonic. A noise is usually disturbing and unpleasant, whether the amplitude is high or low (e.g., noise from mechanical system, impact noise, loud music). Airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave.

Ambient noise is the composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location. The pitch or loudness of sound determines whether a sound is of a pleasant or objectionable nature. Pitch, which is the height or depth of a tone or sound, is louder to humans when it is high-pitched versus low-pitched. The loudness of a sound is determined by a combination of the intensity of the sound waves with the reception characteristics of the ear. Measurement scales are used to describe sounds. A dB is a unit used to describe the amplitude of sound, and sound levels are calculated on a logarithmic, not linear, basis. The lowest sound level that an unimpaired human ear can hear is described as zero on the decibel scale. Due to the logarithmic nature of measuring sound levels on the decibel scale, a 10-dB increase represents a tenfold increase in acoustic energy, whereas a 20 dB increase represents a hundredfold increase in acoustic energy. Because a relationship exists between acoustic energy and intensity, each 10- dB increase in sound level can have an approximate doubling effect on loudness as perceived by the human ear. The most common metric is the overall A-weighted sound level measurement (dBA) that has been adopted by regulatory bodies worldwide. The A-weighting network measures sound in a fashion similar to the way a person perceives or hears sound, thus achieving very good correlation in terms of evaluating acceptable and unacceptable sound levels. Table 4.13-1 provides the relative A-weighted noise levels of common sounds measured in the environment and industry for various qualitative sound levels .

Table 4.13-1: Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level (in decibels)	Qualitative Description
Carrier deck jet operation Jet takeoff (200 feet)	140 130 120	Pain threshold
Auto horn (3 feet) Jet takeoff (1,000 feet) Shout (0.5 feet)	110 100	Maximum vocal effort
Heavy truck (50 feet)	90	Very annoying; hearing damage (8-hour, continuous exposure)
Pneumatic drill (50 feet) Freight train (50 feet) Freeway traffic (50 feet)	80 70 to 80 70	Annoying Intrusive (telephone use difficult)
Air conditioning unit (20 feet) Light auto traffic (50 feet) Living room/bedroom	60 50 40	Quiet
Library/soft whisper (5 feet) Broadcasting/recording studio	30 20 10	Very quiet Just audible

Source: 2020/2021 SREIR (Kern County Planning and Natural Resources Department 2021)

A-weighted sound levels can be measured or presented as equivalent sound pressure level (L_{eq}). This is defined as the average noise level, on an equal-energy basis for a stated period of time and is commonly used to measure steady-state sound or noise hat is usually dominant. Statistical

measurements are typically denoted by Ln, where "n" represents the percentile of time the sound level is exceeded. The measurement of L90 represents the noise level that is exceeded during 90 percent of the measurement period. Similarly, the L10 represents the noise level exceeded for 10 percent of the measurement period. The maximum noise level (L_{max}) is the maximum instantaneous noise level during a specific period of time.

Of particular interest in this analysis are other descriptors of noise that are commonly used to help determine noise/land use compatibility and predict an average community reaction to adverse effects of environmental noise, including traffic-generated, construction, and industrial noise. One of the most universal descriptors is the average day-night level (DNL or L_{dn}). As a result of recommendation by the California Health Department and state planning law, this descriptor is used by many planning agencies, including Kern County's Planning and Community Development Department. The L_{dn} noise metric represents a 24-hour period and applies a time-weighted factor designed to penalize noise events that occur during nighttime hours when relaxation and sleep disturbance are of more concern for average residents. Noise occurring during the daytime hours—between 7:00 a.m. and 10:00 p.m.—is measured in decibels. Noise occurring between 10:00 p.m. and 7:00 a.m., however, is effectively "penalized" by adding 10 dB to the measured level. In California, the use of the CNEL descriptor is also permitted. CNEL is identical to the day-night average sound level metric, except that CNEL adds a 5 dB penalty for noise occurring during evening hours between 7:00 p.m. and 10:00 p.m. as well as the 10 dB penalty added between 10:00 p.m. and 7:00 a.m.

The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud). As shown in Table 4.13-2, changes of 1 to 3 dB are detectable under quiet, controlled conditions, and changes of less than 1 dB are usually not discernible (even under ideal conditions). A 3 dB change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dB is readily discernible to most people in an exterior environment, and a 10 dB change is perceived as a doubling (or halving) of the sound.

Table 4.13-2: Noise Perceptibility

Noise Level	Listener Perception
± 3 dB	Threshold of human perceptibility
± 5 dB	Clearly noticeable change in noise level
± 10 dB	Half or twice as loud
± 20	Much quieter or louder

Source: 2020/2021 SREIR (Kern County Planning and Natural Resources Department 2021)
Key:
dB = decibels

Noise Sensitive Land Uses

Noise sensitive land uses, as defined in the Noise Element of the Kern County General Plan (KCGP), in the project vicinity include one residence and three elementary schools (Kern County 2009). There are no sensitive receptors within the CUP boundary of the project (Table 4.13-3).

Table 4.13-3: Schools in the Vicinity of the Project Site

School Name	Student Population (2022–2023)	District	Distance to CCS Surface Land Area CUP Boundary (miles)	Distance to Injection Well (miles)	Distance to Underground Facility Pipeline (miles)
McKittrick Elementary School	79	McKittrick Elementary	2.97	4.46	2.50
Buttonwillow Elementary School	313	Buttonwillow Union Elementary	4.81	5.99	6.00
Elk Hills Elementary School	163	Elk Hills Elementary School	4.83	5.94	6.00

Key:
CCS = carbon capture and storage
CUP = Conditional Use Permit

Vibration

Vibration is defined as the mechanical motion of the ground, or buildings or other types of structures, that is induced by the operation of mechanical devices or equipment. Vibration generally results in an "oscillatory" motion, in terms of the displacement, velocity, or acceleration of the ground (or structure), that causes a person to be aware of the vibration by means such as, but not limited to, sensation by touch or visual observation of moving objects. The effects of ground-borne vibration include movements of building floors, rattling of windows, and shaking of items on shelves or hangings on the walls. In extreme cases, vibration can cause damage to buildings. The noise radiated from the motion of the room surfaces is called ground-borne noise. Table 4.13-4 presents typical levels of ground-borne vibration, vibration sources, and responses.

Table 4.13-4: Typical Levels of Ground-borne Vibration

Response	Velocity Level[(a)]	Typical Sources (at 50 feet)
Minor cosmetic damage of fragile buildings	100	Blasting from construction projects
Difficulty with tasks such as reading a video display terminal screen	90	Bulldozers and other heavy tracked construction equipment
Residential annoyance, infrequent events	80	Rapid transit, upper range
Residential annoyance, frequent events	70	High speed rail, typical
Approximate threshold for human perception	60	Bus or truck, typical
None	50	Typical background vibration

Source: 2020/2021 SEIR (Kern County Planning and Natural Resources Department 2021)
Note:
[(a)] Root mean square vibration velocity level in vibration decibels relative to 10^{-6} inches per second.

Effects of Noise

The effects of noise on people can be grouped into four general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction;
- Interference with activities such as speech, sleep, learning;
- Physiological effects such as startling; and
- Physical effects such as hearing loss.

In most cases, environmental noise produces effects in the first two categories of subjective effects and interference with activities only; however, workers in industrial plants might experience physiological effects of noise. No satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a common standard is due primarily to the wide variation in individual thresholds of annoyance and habituation to noise.

Noise can interrupt ongoing activities and can result in community annoyance, especially in residential areas. In general, most residents become highly annoyed when noise interferes significantly with activities such as sleeping; talking; noise-sensitive work; and listening to the radio, TV, or music.

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dB. Exposure to high noise levels affects the entire human system, with prolonged noise exposure in excess of 75 dB increasing body tensions and thereby affecting blood pressure, functions of the heart, and the nervous system. In comparison, extended periods of noise exposure above 90 dB could result in permanent hearing damage. People may consider louder environments adverse, but in many cases, people will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dB) or urban or industrial areas (65 to 80 dB).

4.13.2 Environmental Setting

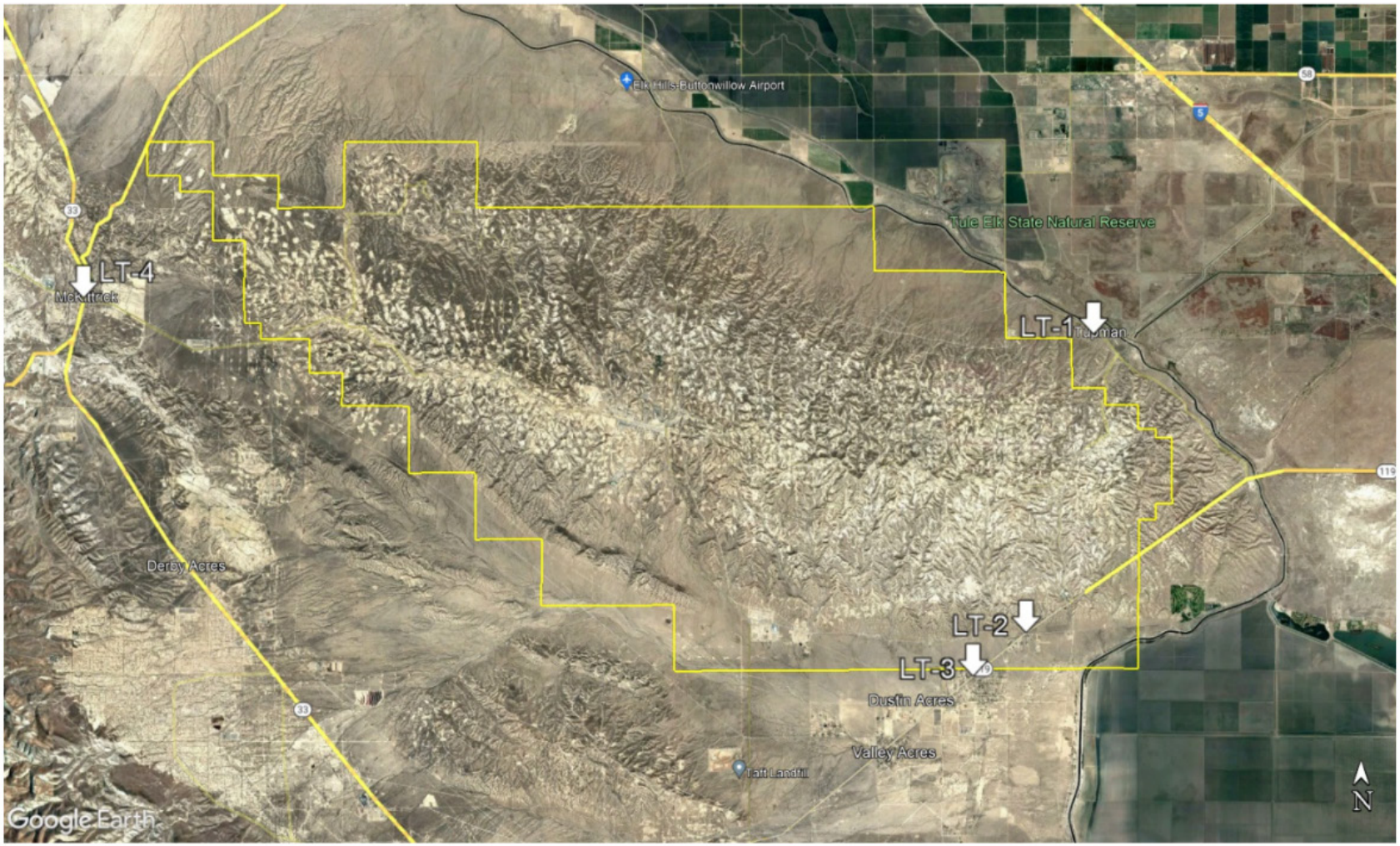
Existing Noise Environment

Existing land uses within Elk Hills generally include oil and gas exploration and production and agricultural lands. The closest sensitive receptor to the project site is McKittrick Elementary School, which is located approximately 3 miles southwest of the CCS Surface Land area boundary, 4.5 miles from an injection well site, and 2.5 miles from the facility underground pipeline, and the nearest residence is approximately 4.5 miles southeast of the injection line.

Long-term (24-hour) ambient noise measurements were conducted in the vicinity of sensitive receptors to the greater project area (see Appendix H) (WJV Acoustics 2023). Measurements of existing ambient noise levels in the project area were conducted on January 26 and 27, 2023. Long-term (24-hour) ambient noise level measurements were conducted at four locations (sites LT-1, LT-2, LT-3 and LT-4) (see Figure 4.13-1). Long-term ambient noise measurement site LT-1 was located within the community of Tupman, near the corner of Emmons Boulevard (Tupman Road) and Grace Boulevard. Ambient noise measurement site LT-2 was located in the vicinity of residential land uses along Taft Highway. Ambient noise measurement site LT-3 was located in the vicinity of residential land uses in the community of Dustin Acres, near the intersection of Taft Highway and Tank Farm Road. Ambient noise measurement site LT-4 was located within the community of McKittrick, near the corner of Reward Road and 2nd Street.

Measured hourly L_{eq} at site LT-1 ranged from a low of 39.8 dB between 2:00 a.m. and 3:00 a.m. to a high of 63.1 dB between 2:00 p.m. and 3:00 p.m. Hourly L_{max} noise levels at site LT-1 ranged from 56.4 to 86.6 dB. Residual noise levels at the monitoring site, as defined by the L_{90} statistical descriptor ranged from 32.1 to 47.6 dB. The L_{90} is a statistical descriptor that defines the noise level exceeded 90 percent of the time during each hour of the sample period. The L_{90} is generally considered to represent the residual (or background) noise level in the absence of identifiable single noise events from traffic, aircraft and other local noise sources. The measured L_{dn} value at site LT-1 during the 24-hour noise measurement period was 60.8 dB.

Figure 4.13-1: Project Vicinity and Ambient Noise Measurement Locations



Measured hourly L_{eq} at site LT-2 ranged from a low of 58.1 dB between 11:00 p.m. and midnight to a high of 74.3 dBA between 1:00 p.m. and 2:00 p.m. Hourly L_{max} noise levels at site LT-2 ranged from 77.8 to 88.4 dB. Residual noise levels at the monitoring site, as defined by the L_{90}, ranged from 46.1 to 54.2 dB. The measured L_{dn} value at site LT-2 during the 24-hour noise measurement period was 74.1 dB.

Measured hourly L_{eq} at site LT-3 ranged from a low of 55.9 dB between 2:00 a.m. and 3:00 a.m. to a high of 70.6 dBA between 4:00 p.m. and 5:00 p.m. Hourly L_{max} noise levels at site LT-3 ranged from 77.7 to 87.5 dB. Residual noise levels at the monitoring site, as defined by the L_{90}, ranged from 43.1 to 51.4 dB. The measured L_{dn} value at site LT-3 during the 24-hour noise measurement period was 71.4 dB. These ambient measurements can be considered to be similar to those at the McKittrick Elementary School. The school does not operate 24 hours a day or year round.

4.13.3 Regulatory Setting

Federal

Federal highway and aircraft guidelines and regulations have been established by agencies listed in Table 4.13-5. Federal guidelines and regulations are summarized in Table 4.13-5. These federal regulations do not apply to project activities but may be applicable to existing activities in the project area and also represent useful benchmarks for noise standards used by other agencies.

Table 4.13-5: Federal Guidelines and Regulations for Exterior Noise (dBA)

Agency	L_{eq}	DNL
Federal Energy Regulatory Commission	[49]	55
U.S. Department of Transportation (construction noise level at residential land use during daytime)(a)	90	---
Federal Highway Administration	67	[67]
Federal Aviation Administration	[59]	65
U.S. Department of Housing and Urban Development(b)	[59]	65

Sources:
(a) FTA 2006
(b) 24 CFR 51B; HUD 1991
Note: Brackets around numbers (e.g., [59]) indicate a calculated equivalent standard. Because FHWA regulates peak noise level, the DNL is assumed equivalent to the peak noise hour.
Key:
CFR = Code of Federal Regulations
dBA = A-weighted decibels
DNL = day-night level
FHWA = Federal Highway Administration
L_{eq} = equivalent sound level

Occupational Safety and Health Act of 1970

On-site noise levels are regulated by the Occupational Safety and Health Administration (OSHA). This regulation protects workers from the effects of occupational noise exposure. The noise exposure level of workers is regulated at 90 dBA over an 8-hour work shift to protect hearing (29 CFR 1910.95). Employee exposure to levels exceeding 85 dBA requires that employers develop a hearing conservation program. Such programs include adequate warning, the provision of hearing protection devices, and periodic employee testing for hearing loss.

State

California Division of Occupational Safety and Health

The California Division of Occupational Safety and Health implements and enforces the noise exposure limits established by the federal OSHA, as described above, for the state of California. No state regulations apply to noise specifically for the proposed project; however, there are general state guidelines provided by the California Department of Health Services that define acceptable noise levels based on a land use compatibility matrix designed to protect residents and other sensitive land uses from excessive noise levels. These guidelines help to define a threshold for acceptable noise levels for residential areas in the project area. The California Department of Health Services has identified DNL or CNEL values of 60 dBA or less as normally acceptable outdoor levels for residential areas.

California Noise Control Act of 1973

Sections 46000 through 46080 of the California Health and Safety Code, known as the California Noise Control Act of 1973, declares that excessive noise is a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological and economic damage. It also identifies a continuous and increasing bombardment of noise in the urban, suburban and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention and abatement of noise. It is the policy of the state to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

California Department of Transportation Construction Vibration Guidance Manuel

One of the most recent references suggesting vibration guidelines is the California Department of Transportation (Caltrans) Transportation and Construction Vibration Guidance Manual (Caltrans 2013). The manual provides guidance for determining annoyance potential criteria and damage potential threshold criteria. These criteria are provided below in Table 4.13-6 and Table 4.13-7 and are presented in terms of peak particle velocity (PPV) in inches per second.

Table 4.13-6: Caltrans Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (inches/second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.1
Severe	2.0	0.4

Source: Caltrans 2013
Key:
PPV = peak particle velocity

Table 4.13-7: Caltrans Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (inches/second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile, historic buildings, ancient monuments	0.13	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Caltrans 2013
Key:
PPV = peak particle velocity

Local

Noise Level Standards

Kern County General Plan

The Kern County Noise Element of KCGP (Noise Element) establishes noise level criteria in terms of the L_{dn} metric. The L_{dn} is the time-weighted energy average noise level for a 24-hour day, with a 10 dB penalty added to noise levels occurring during the nighttime hours (10:00 p.m.-7:00 a.m.). The L_{dn} represents cumulative exposure to noise over an extended period of time and is therefore calculated based upon annual average conditions.

The Noise Element establishes a land use compatibility criterion of 65 dB L_{dn} for exterior noise levels in outdoor activity areas of residential uses. Outdoor activity areas generally include backyards of single-family residences and individual patios or decks of multi-family developments. The intent of the exterior noise level requirement is to provide an acceptable noise environment for outdoor activities and recreation.

The Noise Element also requires that interior noise levels attributable to exterior noise sources not exceed 45 dB L_{dn}. The intent of the interior noise level standard is to provide an acceptable noise environment for indoor communication and sleep. Excerpts from the KCGP Noise Element relevant to the proposed project are provided below.

The following noise sensitive land uses have been identified in the County:

- Residential areas
- Schools
- Convalescent and acute care hospitals
- Parks and recreational areas
- Churches

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 2. Require noise level criteria applied to all categories of land uses to be consistent with the recommendations of DOSH.

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; and

(b) 45 dB L_{dn} or less within interior living spaces or other noise sensitive interior spaces.

Policy 6. Ensure that new development in the vicinity of airports will be compatible with existing and projected airport noise levels as set forth in the Airport Land Use Compatibility Plan (ALUCP).

Policy 7. Employ the best available methods of noise control.

Implementation Measures

The following are programs to be carried out by Kern County to implement the goals and policies of the Noise Element.

Implementation Measure A. Utilize zoning regulations to assist in achieving noise-compatible land use patterns.

Implementation Measure C. Review discretionary development plans, programs, and proposals, including those initiated by both the public and private sectors, to ascertain and ensure their conformance to the policies outlined in this element.

Implementation Measure E. Review discretionary development plans to ensure compatibility with adopted Airport Land Use Compatibility Plans.

Implementation Measure F. Require proposed commercial and industrial uses or operations to be designed or arranged so that they will not subject residential or other noise sensitive land uses to exterior noise levels in excess of 65 dB Ldn and interior noise levels in excess of 45 dB Ldn.

Implementation Measure G. At the time of any discretionary approval, such as a request for a General Plan Amendment, zone change or subdivision, the developer may be required to submit an acoustical report indicating the means by which the developer proposes to comply with the noise standards. The acoustical report shall:

(a) Be the responsibility of the applicant.

(b) Be prepared by a qualified acoustical consultant experienced in the fields of environmental noise assessment and architectural acoustics.

(c) Be subject to the review and approval of the Kern County Planning Department and the Environmental Health Services Department. All recommendations therein shall be complied with prior to final approval of the project.

Implementation Measure I. Noise analyses shall include recommended mitigation measures, if required, and shall:

(a) Include representative noise level measurements with sufficient sampling periods and location to adequately describe local conditions.

(b) Include estimated noise levels, in terms of CNEL, for existing and projected future (10 to 20 years hence) conditions, with a comparison made to the adopted policies of the Noise Element.

(c) Include recommendations for appropriate mitigation to achieve compliance with the adopted polices and standards of the Noise Element.

(d) Include estimates of noise exposure after the prescribed mitigation measures have been implemented. If compliance with the adopted standards and policies of the Noise Element will not be achieved, a rationale for acceptance of this project must be provided.

Implementation Measure J. Develop implementation procedures to ensure that requirements imposed pursuant to the findings of an acoustical analysis are conducted as part of the project permitting process.

Kern County Code of Ordinances

Section 8.36 (Noise Control) of the Kern County Code of Ordinances limits construction to the hours of 6:00 a.m. to 9:00 p.m. on weekdays, and between 8:00 a.m. and 9:00 p.m. on weekends, when construction is within 1,000 feet of a residence. Certain exceptions to these hours are specified in the code.

4.13.4 Impacts and Mitigation Measures

Methodology

Noise impacts associated with the proposed project assessed in this section are based primarily on the September 2023 Environmental Noise Assessment prepared by WJVA (Appendix H) (WJVA Acoustics 2023) and project-related traffic data provided by the Ruettgers & Schuler Civil Engineers (Appendix I) (Ruettgers & Schuler 2023).

Thresholds of Significance

The Kern County California Environmental Quality Act (CEQA) Implementation Document and Kern County Environmental Checklist identify the following criteria, as established in Appendix G of the CEQA Guidelines, to determine if a project could have a significant noise-related adverse effect. The thresholds identified in Appendix G of the Guidelines indicate that a project would normally be considered to have a significant impact if it would result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- For a project located within the Kern County Airport Land Use Compatibility, would the project expose people residing or working in the project area to excessive noise levels.

Project Impacts

Impact 4.13-1: Generate a Substantial Temporary or Permanent Increase in Ambient Noise Levels in the Vicinity of the Project in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies

In accordance with the CEQA Guidelines, noise impacts associated with the proposed project were analyzed against the standards identified in the KCGP with consideration of the specific type of 24-hour operation created by injection well construction activities as well as abandonment of wells, creation of monitoring and seismic monitoring wells, and operation of the capture and injection process.

The KCGP applies an exterior noise level standard of 65 dB DNL for defined noise-sensitive receptors. A substantial permanent increase in ambient noise levels would occur if noise level increase in excess of 65 dBA CNEL. This analysis examined both temporary and operational noise levels.

Construction Impacts

Short-term construction noise impacts could result from land clearing and grading for well pads and work areas; construction/maintenance of access roads; construction of accessory facilities (including pipelines, electrical transmission lines, drilling sumps or temporary storage tanks); transporting the drilling rig, associated equipment, workers, and materials to the well pad site; well drilling; and construction equipment operations. Project construction is expected to take up to two years. However, construction duration may vary based on factors such as weather, seasonal environmental constraints, resource availability, or various site-specific conditions. Below is a list of the different construction phases and the following sections describe each phase and its temporary construction impacts.

- Well Drilling Activities
- Pipeline Construction Activities
- Compression and Pumping Facility Construction

Well Drilling Activities

The Well Drilling Activities phase of the proposed project includes several components, including drilling of new injection wells, conversion of existing wells to injection wells, monitoring and seismic monitoring wells, and abandonment activities. For the noise modeling effort, construction activities would include well pad site preparation activities, such as geophysical surveys, land clearing and grading for well pads, access road construction or improvement, construction of temporary drilling sumps, installation, completion, and initial operation (testing) of new wells and ancillary equipment, installation of temporary equipment and facilities such as storage tanks or drilling sumps, and spill prevention activities. Construction activities would result in temporary elevated noise levels.

The exact drill rig or rigs to be used for these activities was not known at the time of the noise analysis. Extensive noise levels measurements as well as extensive noise modelling relating to noise levels associated with well drilling activities were conducted. During the preparation of the Kern County Oil and Gas EIR, noise level measurements were conducted for numerous drill rigs, in December 2014 and January 2015. These noise level measurements were used as inputs into the SoundPLAN ISO 9613to calculate noise exposure levels in terms of the DNL, which is the noise metric applicable to the Kern County noise level standards. The largest and loudest of these measured drill rigs was the exploratory rig, Kenai #7. As the noise levels associated with this rig represent a worst-case assessment of drilling noise levels, they are applied for the purpose of this analysis. Additionally, the analysis applied the loudest measured noise levels, as measured from various positions around the rig, while in operation, and assumed that these noise levels would be constant, over a 24-hour period. As such, modelled noise levels should be considered a worst-case assessment of project-related well drilling activities. It is also important to recognize that, in scenarios where the topography is relatively flat or there is a steady slope away from a sound source located on a hill, the SoundPLAN ISO 9613 method is overly conservative and can over-predict noise by up to 6 dB, even where line-of-sight from the receiver location to the turbine hub is not broken. The model included the loudest observed noise measurement for each source as a basis for modeling potential Project-related noise exposure. The model included no shielding as a result of buildings or other structures that may be in the sound propagation path. These assumptions represent a highly conservative, worst-case assessment in regard to regarding noise propagation from individual source.

Well decommissioning and abandonment would entail plugging and abandoning wells once they are no longer productive. Well decommissioning and abandonment would involve removal, disassembly, and salvage or disposal of pumping units, well cellars, pipelines, and associated infrastructure, plugging the well with concrete and steel plates, and restoration of the well pad. Equipment used for decommissioning and abandonment varies somewhat from that used for construction but would be expected to generate similar or lesser noise levels. Typical equipment used on site for decommissioning and abandonment may include bulldozers, motor graders, front-end loaders, cement and dump trucks.

The Kern County noise level standard applicable to the proposed project area is 65 dB Ldn or an incremental noise increase of not over 5 dB. The SoundPLAN ISO 9613was used to calculate setback distances to various noise contours for Kenai #7 Rig. The modelled distance from the rig to the 65 dB L_{dn} noise level contour was 3,270 feet (approximately 0.6 miles). As described above, the closest residential sensitive receptors to the project area are at setback distances of almost 5 miles or greater. At a setback distance of 4 to 5 miles, noise levels associated with the large-scale exploratory rig would be approximately 47 dB L_{dn}.

These modeled noise levels do not take into account any acoustical shielding that would occur from intervening topography or any atmospheric or ground absorption or any required mitigation. Therefore, they are considered a worst-case assessment of noise levels associated with drilling activities and construction activity at nearby sensitive receptor locations.

Pipeline Construction Activities

New pipe would be installed above ground only at the connection to the capture facility site and underground for the length of the pipeline, using primarily traditional cut and cover trenching techniques with short jack and bores used for road crossings, if necessary. The proposed project also includes establishing a temporary construction corridor, temporary storage and laydown areas, and hydrostatic testing. It is anticipated that up to 11 miles of up to 16-inch pipeline would be constructed.

Pipeline construction is likely to occur on multiple sections of the pipeline at once. An estimated rate of installation is approximately 400 feet of pipe per day. Pipeline installation rates are dependent on terrain and other site-specific conditions and number of welds required in the trench. Other work related to the facilities may also overlap with the pipeline construction work. Idling and purging would occur after the new pipeline for each phase of construction is operational.

Noise levels associated with pipeline construction activities are broken down into two components: (1) excavation and backfill and (2) pipe installation. These two components have their own timeline and equipment list, which are summarized in Table 4.13-8 and Table 4.13-9.

Table 4.13-8: Construction Equipment Pipeline Excavation and Backfill

Equipment Type	Quantity	Full-Time	Part-Time
1-Ton Work Truck	12	X	
5-Ton Utility Flat Bed Truck	4		X
12-Yard Dump Truck	12	X	
Soft Dig Truck 350 CFM	2	X	
Hydro Vac Trucks	2		X
2500-Gallon Water Truck	4		X
185 CFM Air Compressor	4		X
Backhoe	4	X	
2-Yard Loader	3	X	
45k pound Excavator	2	X	
36-inch Ride on Compactor	4	X	

Source: California Resources Corporation
Key:
CFM = cubic feet per minute

Table 4.13-9: Construction Equipment Pipeline Installation

Equipment Type	Quantity	Full-Time	Part-Time
1-Ton Work Truck	16	X	
5-Ton Utility Flat Bed Truck	6		X
2500-Gallon Water Truck	4		X
25-Ton Stringer Crane	3	X	
15-Ton Boom Truck	3	X	
25T RT Crane	3		X
D6 Side Boom	6	X	
Bending Machine	1		X
185 CFM Air Compressor	4	X	
400 CFM Air Compressor	1		X
250-amp Welding Machine	8	X	
4000W Generator	4		X
DitchWitch HDD Machine	1		X
Vacuum Truck	2		X

Source: California Resources Corporation
CFM = cubic feet per minute
HDD = horizontal directional drill
RT = rough terrain
W = watts

Although certain pieces of equipment would be utilized on a part-time basis, for the purpose of this analysis, noise levels were based on the worst-case assumption that all pieces of equipment were operable simultaneously and utilized full-time (approximately 10 hours per day). The Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) was used to estimate project-related construction noise levels at nearby sensitive receptor locations (Caltrans 2006). Construction noise levels were at a setback distance of 5 miles, the approximate distance of the closest sensitive receptor to the proposed construction activities.

Noise levels associated with excavation and backfill construction activities would be approximately 34 dB $L_{eq.}$ Noise levels associated with pipeline installation would be approximately 36 dB $L_{eq.}$ As previously stated, these modeled construction noise levels do not take into account atmospheric absorption or acoustical shielding from intervening topography or terrain between the construction area and the location of sensitive receptors. As such, the noise levels described above should be considered a worst-case assessment of construction noise levels.

Compression and Pumping Facility Construction Activities

Construction of the Compression and Pumping Facility would include the following activities:

- Site preparation
- Construction of access and site internal roads
- Grading and earthwork
- Dust control
- Concrete foundations
- Major equipment installation
- Structural steel work
- Electrical/instrumentation work
- Storm water management facilities
- Architecture and landscaping

Noise levels associated with compression and pumping facility construction activities are broken down into two components: (1) booster station and (2) substation. These two components have their own timeline and equipment list, which are summarized in Table 4.13-10 and Table 4.13-11.

Table 4.13-10: Construction Equipment for Compression and Pumping Facility – Booster Station

Equipment Type	Quantity	Full-Time	Part-Time
Hydro-Crane	3	X	
Reach Lift	1	X	
Backhoe	3	X	
130–200 Ton Crane	1		X
20–40 Ton Crane	1		X
Grader	2		X
Scraper	1		X
Front Loader and Truck	1		X

Source: California Resources Corporation

Table 4.13-11: Construction Equipment for Compression and Pumping Facility – Substation

Equipment Type	Quantity	Full-Time	Part-Time
Crane	1		X
Backhoe	2		X
Grader	2	X	
Scraper	1		X
Front Loader and Truck	1		X

Source: California Resources Corporation

Although certain pieces of equipment would be utilized on a part-time basis, for the purpose of this analysis, noise levels were based on the worst-case assumption that all pieces of equipment were operable simultaneously and utilized full-time (approximately 10 hours per day). The FHWA RCNM was used to estimate project-related construction noise levels at nearby sensitive receptor locations. Construction noise levels were modelled at a setback distance of 5 miles which is the approximate distance of the closest sensitive receptor to the proposed construction activities.

The results of the noise model indicated that construction noise levels associated with the booster station construction would be approximately 33 dB $L_{eq.}$ Additionally, noise levels associated with the construction of the substation would be approximately 32 dB $L_{eq.}$

As previously stated, these modeled construction noise levels do not take into account atmospheric absorption or acoustical shielding from intervening topography or terrain between the construction area and the location of sensitive receptors. As such, the noise levels described above should be considered a worst-case assessment of construction noise levels. Below is a summary of construction noise levels at a distance of 5 miles (Table 4.13-12).

Table 4.13-12: Noise Levels Day-Night

Activity	Noise in Day-Night Level (L_{dn})
Well Drilling Activities	47 dB L_{dn}
Pipeline Construction – Excavation and Backfill	34 dB L_{dn}
Pipeline Construction – Pipeline Installation	36 dB L_{dn}
Compression and Pumping Facility Construction – Booster Station	33 dB L_{dn}
Compression and Pumping Facility Construction – Substation	32 dB L_{dn}

Key:
L_{dn} = day/night average sound level

Ambient Increase

The CEQA Guidelines require evaluation of noise impacts against the standards developed by the pertinent local agency. As discussed above, project activities would occur within the boundaries of the KCGP. The Noise Element of the KCGP establishes a land use compatibility criterion of 65 dB L_{dn} for exterior noise levels in outdoor activity areas of residential uses with an additional noise level for oil and gas operations for an incremental increase of no more than 5 dB over ambient.

As described in Section 4.13.2, Environmental Setting, there are no noise sensitive land uses located in the project area. Therefore, long-term (24-hour) ambient noise measurements were conducted at four locations within the greater project area, which included the nearest sensitive noise receptors. The four noise monitor locations had DNL values ranging from 56.7 dB to 74.1 dB, with an average of 65.8 dB.

The modeled construction noise levels were compared to the existing ambient noise levels at the four sensitive receptor locations. This evaluation concluded that the highest noise level during construction would be 47 dB associated with well drilling activities. Comparing this noise level to the average noise level of the noise monitor locations, 65.8 dB, the construction noise level would not be audible over existing average ambient noise levels at the sensitive receptor locations. Therefore, the proposed project would not generate a substantial temporary increase in ambient noise levels at nearby sensitive receptor locations.

Traffic Noise

The proposed project would result in a temporary increase in vehicle trips during the construction phases (Pipeline Construction Phase and Compression and Pumping Facility Construction Phase).

An operational trip generation analysis is included in Appendix I. This analysis describes the anticipated project-related daily trips for the project phases identified above but does not provide the distribution of these trips among nearby roadways. In order to assess potential project-related increases in traffic noise, the analysis individually applied all anticipated project-related trips to each roadway in the greater project area. This results in a worst-case assessment of project-related traffic noise increases as it assumes all project trips are applied to each roadway individually.

The above-described trip generation analysis provided anticipated daily project-related traffic volumes during project construction. The traffic analysis provided the following associated project-related daily trips:

- Pipeline Construction Phase: 52 trucks
- Carbon dioxide (CO_2) Compression and Pumping Facility Construction Phase: 160 vehicles (employee cars)

The project construction schedule indicates that the Pipeline Construction Phase and the CO_2 Compression and Pumping Facility Construction Phase would generally occur simultaneously. As such, the project-related traffic volumes for these phases were combined to provide a worst-case assessment of project-related increases in traffic noise.

The increased daily traffic trips were modeled to provide a generalized understanding of overall increases in traffic noise associated with the project. The FHWA Traffic Noise Model was utilized to quantify generalized increases in traffic noise. The model is based upon reference energy emission levels for automobiles, medium trucks (two axles) and heavy trucks (three or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions and is generally considered to be accurate within ±1.5 dB. To predict L_{dn} values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume.

As stated above, the distribution of the project-related trips over the local roadways was not provided as part of the traffic study. For a generalized and worst-case analysis, anticipated noise levels that would occur if all project-generated trips were applied to each individual roadway segment were modeled. Truck percentages along Taft Highway and Stockdale Highway used in the model were provided by Caltrans. Truck percentages along the remaining roadway segments, as well as the day/night distribution of traffic, were estimated based upon previous noise studies conducted along similar roadways.

Table 4.13-13 provides traffic noise exposure levels for existing conditions as well as existing conditions plus construction traffic (Pipeline Construction Phase and the CO_2 Compression and Pumping Facility Construction Phase combined). Noise levels provided in Table 4.13-13 represent those that would occur at a reference setback distance of 150 feet from the centerline of each roadway segment.

Table 4.13-13: Construction Phase - Modeled Traffic Noise Levels, Existing Conditions

Roadway Segment	Existing dB, L_{dn}	Existing Plus Project dB, L_{dn}	Change dB, L_{dn}	Impact (Yes/No)?
Elk Hills Road (north of Skyline Drive)	59	59	0	No
Elk Hills Road (south of Skyline Drive)	59	59	0	No
Taft Highway/SR 119 (near Dustin Acres)	67	67	0	No
Elk Hills Road (north of Taft Highway)	60	60	0	No
Stockdale Hwy (east of Wasco Way)	56	57	+1	No
Brite Road (west of Wasco Way)	63	63	0	No

Key:
dB = decibels
L_{dn} = average day/night level
SR = State Route

Table 4.13-14 provides traffic noise exposure levels for 2046 conditions as well as 2046 conditions plus construction traffic (Pipeline Construction Phase and the CO_2 Compression and Pumping Facility Construction Phase combined). Noise levels provided in Table 4.13-14 represent those that would occur at a reference setback distance of 150 feet from the centerline of each roadway segment.

Table 4.13-14: Construction Phase - Modeled Traffic Noise Levels, 2046 Conditions

Roadway Segment	Existing dB L_{dn}	Existing Plus Project dB L_{dn}	Change dB L_{dn}	Impact (Yes/No)?
Elk Hills Road (north of Skyline Drive)	59	59	0	No
Elk Hills Road (south of Skyline Drive)	59	59	0	No
Taft Highway/SR 119 (near Dustin Acres)	67	67	0	No
Elk Hills Road (north of Taft Highway)	60	60	0	No
Stockdale Hwy (east of Wasco Way)	56	57	+1	No
Brite Road (west of Wasco Way)	63	63	0	No

Key:
dB = decibels
L_{dn} = average day/night level
SR = State Route

Reference to Table 4.13-13 and Table 4.13-14 indicate the project-related traffic noise associated with the construction phases would not result in any increase in traffic noise exposure levels along roadways in the project vicinity. Noise levels along Stockdale Highway (east of Wasco Way) could increase by up to 1 dB. However, the modeled noise levels applied to all project-related traffic volumes are conservative; therefore, these levels are considered a worst-case assessment of project-related increases in traffic noise.

Summary

An analysis was conducted to assess the construction noise levels in relation to the average ambient noise levels across the four noise measurement locations. The highest noise level anticipated during construction, resulting from well drilling activities, would be 47 dB. When compared to the average noise level at the four noise measurement locations, which was 65.8 dB, it was determined that the construction related noise levels would not be significantly audible above the existing ambient noise levels. Additionally, temporary noise levels relating to construction traffic would not generally result in any increase in traffic noise exposure levels along roadways in the project vicinity. Therefore, the proposed project would not generate a substantial temporary increase in ambient noise levels, and impacts would be less than significant.

Operation Impacts

Once operational, project-related noise would generally be limited to noise associated with the usage of compressors at injection wells and the gas plant. The exact make and model of these compressors were not known at the time the noise analysis was completed. However, the following compressor selection and details were assumed in coordination with the project proponent.

- Manufacturer: Dresser-Rand
- Type: Reciprocating
- Frame: 7HOSS6
- Motor: 4000 HP Electric Motor, 13200V @ 720 rpm
- Max Rod Load (pounds): 75,000
- Rated BHP: 7,800
- Rated RPM: 1,000
- Stages: Five

Noise levels associated with the proposed equipment would be approximately 85 dBA at a distance of 3 feet. Noise levels at a distance of 5 miles from the project area were calculated to be approximately 20 dB. Similar to the modelled construction noise levels, the modeled operational noise levels do not take into account atmospheric absorption or acoustical shielding from intervening topography or terrain between the project area and the location of sensitive receptors. As such, the noise level described above would be a worst-case assessment of operational noise level.

Ambient Increase

The modeled operational noise level (20 dB) was compared to the average existing ambient noise levels at the four sensitive receptor locations (65.8 dB). This evaluation concluded that the noise levels from project operations and maintenance activities would not be audible over existing ambient noise levels at any of the sensitive receptor locations. Therefore, the proposed project would not generate a substantial permanent increase in ambient noise levels.

Traffic Noise

The trip generation analysis concluded the project would result in a permanent increase of 20 daily vehicle trips during the CO_2 Compression and Pumping Facility Operation and Maintenance Phase. However, it did not provide the distribution of these trips along nearby roadways. In order to assess potential project-related increases in traffic noise, an analysis was prepared that individually applied all anticipated project-related trips to each roadway in the project vicinity. This results in a worst-case assessment of project-related traffic noise increases as it assumes all project trips are applied to each roadway individually.

Traffic noise levels were analyzed for both existing and 2046 traffic conditions along six roadway segments in the project vicinity. These roadway segments represent the roadways that border the project area, and that would likely be utilized to access the overall project site. It is anticipated that project-related traffic would generally access the site via Elk Hills Road and Gate 4 (Skyline Drive). Most project-related traffic would access Elk Hills Road via State Route 119 (SR 119) to Valley West Road. However, some project-related traffic could access the project site from the north, via Stockdale Highway, Wasco Way, and Brite Road. For the purpose of this analysis, all project-related traffic was applied to each roadway segment individually.

The increased daily traffic trips were modeled to provide a generalized understanding of overall increases in traffic noise associated with the project. The FHWA Traffic Noise Model was utilized to quantify generalized increases in traffic noise (FHWA 2004). The model is based upon reference energy emission levels for automobiles, medium trucks (two axles) and heavy trucks (three or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions and is generally considered to be accurate within ±1.5 dB. To predict L_{dn} values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Table 4.13-15 provides traffic noise exposure levels for existing conditions as well as existing conditions plus traffic associated with CO_2 Compression and Pumping Facility Operation and Maintenance Phase. Noise levels provided in Table 4.13-15 represent those that would occur at a reference setback distance of 150 feet from the centerline of each roadway segment.

Table 4.13-15: Operations and Maintenance - Modeled Traffic Noise Levels, Existing Conditions

Roadway Segment	Existing dB L_{dn}	Existing Plus Project dB L_{dn}	Change dB L_{dn}	Impact (Yes/No)?
Elk Hills Road (north of Skyline Drive)	59	59	0	No
Elk Hills Road (south of Skyline Drive)	59	59	0	No
Taft Highway/SR 119 (near Dustin Acres)	67	67	0	No
Elk Hills Road (north of Taft Highway)	60	60	0	No
Stockdale Highway (east of Wasco Way)	56	56	0	No
Brite Road (west of Wasco Way)	63	63	0	No

Key:
dB = decibels
L_{dn} = average day/night level
SR = State Route

Table 4.13-16 provides traffic noise exposure levels for 2046 conditions as well as 2046 conditions plus traffic associated with the proposed project. Noise levels provided in Table 4.13-16 represent those that would occur at a reference setback distance of 150 feet from the centerline of each roadway segment.

Table 4.13-16: Operations and Maintenance - Modeled Traffic Noise Levels, , Existing Conditions

Roadway Segment	Existing dB L_{dn}	Existing Plus Project dB L_{dn}	Change dB L_{dn}	Impact (Yes/No)?
Elk Hills Road (north of Skyline Drive)	59	59	0	No
Elk Hills Road (south of Skyline Drive)	59	59	0	No
Taft Highway/SR 119 (near Dustin Acres)	67	67	0	No
Elk Hills Road (north of Taft Highway)	60	60	0	No
Stockdale Highway (east of Wasco Way)	56	56	0	No
Brite Road (west of Wasco Way)	63	63	0	No

Key:
dB = decibels
L_{dn} = average day/night level
SR = State Route

As shown in Table 4.13-15 and Table 4.13-16, project-related traffic noise would not result in any increase in traffic noise exposure levels along roadways in the project vicinity. Therefore, no significant increase in noise levels would occur along area roadways as a result of the proposed project.

Summary

The operational noise levels would not be audible over the existing ambient noise levels of the operational power plant and oilfield. Additionally, project-related traffic noise would not result in any increase in traffic noise exposure levels along roadways in the project vicinity.

There are no sensitive receptors closer than 2 miles to a construction site, and there would be no permanent operations of the injection well closer than 4 to 5 miles. The standard for oil and gas requires that the ambient level at any sensitive receptor as defined within 4,000 feet of construction or operational facilities for the project shall be under 65 dB. If the ambient level would be over 65 dB at the site, it cannot exceed 5 dB due to the project noise impacts. MM 4.13-1 provides for the study required prior to construction and a study when injection operations begin. The study will verify the acoustical study conclusions and, if the proposed project exceeds the noise limits at the property line of the sensitive receptor, provide for measures for sound reduction and monitoring.

Mitigation Measures

MM 4.13-1 Construction

Prior to issuance of any grading or construction permits, the owner/operator shall comply with the following noise information regarding both construction and operations phase of the project.

A. Noise Site Map A map showing the location of any sensitive receptors within 4,000 feet of the construction activity. A sensitive receptor is defined as a single or multi-family dwelling unit, place of public assembly (a legally permitted place where 100 or more people gather together in a building or structure for the purpose of amusement, entertainment, or retail sales), church, institution, school, or hospital. If there are no sensitive receptors within the 4,000-foot potential impact area, then no construction or operational noise measures shall be required. ,.

B. Noise Standards

1. For locations where the ambient level is below 65 dB, noise levels from operation of the well may not increase the existing ambient level at the property line of the sensitive receptor by more than 5dB and may not exceed 65 dB at the property line of the sensitive receptor.
2. For locations where the ambient level is at or in excess of 65 dB, noise levels from operation of the well may not increase the existing ambient level at the property line of the sensitive receptor by more than 1 dB.

C. Acoustic Noise Reduction Report

1. An Acoustic Noise Reduction Report completed by a qualified professional shall be provided if the there are sensitive receptors within 4000 feet. . The report and submitted site vicinity map shall include all dimensions and detailed notes, based on the Acoustic Noise Reduction Report detailed in this measure.
2. Clearly marked distances in feet and with coordinates from the construction location on the well site to the nearest sensitive receptors both exterior wall of the receptor and the property line within the potential impact area.
3. Notes showing the average day-night level (DNL or Ldn) of ambient outdoor noise level at the proposed well location and at the property line of the nearest identified sensitive receptors that face the drill site over a 24-hour period.
4. Specific details from the Acoustic Noise Reduction Report specifying the level of project activity noise at the property line of the sensitive receptor allowed under the Noise Standard and the projected level of noise from the Project.
5. The report shall identify and include the specific noise reduction method or methods that will be implemented and shall not include options for compliance. Any changes to the selected method or methods of compliance after approval will require submission of

an amended Acoustic Noise Reduction Report reflecting the new selection.

Construction

a. Placement of a temporary sound attenuation wall(s) on property controlled by the applicant or with written permission from the property owner.

b. Construction of a temporary berm on property controlled by the applicant or with written permission from the property owner/

c. Specific orientation of the drilling equipment on the well site and modification of equipment to reduce noise impacts.

d. Implementation of other detailed sound reduction technologies or practices with evidence from the qualified professional of the reductions achieved.

e. Written confirmation from the occupants of the sensitive receptor(s) of their voluntary, temporary relocation or business restrictions during a defined construction period.

Operation

a. A permanent barrier wall or combination wall and berm that will reduce the noise level from operations to meet the standard. Installation to be completed before commencement of operation of capture equipment and first injection of CO_2.

b. Changes in operational equipment or tempo of operations that would reduce the noise level from operations to meet the standard.

D. Monitoring

Construction

a. For the duration of the construction the following measurements shall be submitted to the Kern County Planning and Natural Resources Department at the required intervals. The measurements shall show achievement of the stated average day and night noise level stated on the Site Plan. If the measurement does not show the level is achieved, additional measures must be proposed and installed to prevent a stop work notice. Failure to submit within one business day after taking the required measurements will result in a stop work notice.

b. 24 hours after completion of all noise attenuation measures and commencement of drilling or rework activities, the applicant shall take a measurement at the ambient level at the property line of the identified, nearest sensitive receptor.

c. Every 14 days after commencement of activities, the applicant shall take a measurement at the ambient level at the property line of the identified, nearest sensitive receptor until completion of construction activities.

d. All installed noise attenuation measures shall be maintained throughout all construction phase activities.

Operation

a. Concurrent with the commencement of capture activities and injection of CO_2, agreements with the sensitive receptor property owners shall be completed for 24 hour noise monitoring. An operational noise monitoring report shall include 7 days of 24 hour monitoring at the sensitive receptor property line during normal operations of the CCS project. If the noise standard is not achieved, then additional mitigation for operations is required to be submitted and implemented after review and approval by Kern County Planning and Natural Resources.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.13-2: Expose Persons to, or Generate, Excessive Ground-borne Vibration or Ground-borne Noise Levels

The dominant sources of man-made vibration are sonic booms, blasting, pile driving, pavement breaking, demolition, diesel locomotives, and rail-car coupling. None of these activities are anticipated to occur with construction or operation of the proposed project. Typical vibration levels at distances of 100 feet and 300 feet are summarized by Table 4.13-17. As stated above, construction activities would occur at distance of 5 miles or greater from any existing sensitive receptor locations. As such, excessive construction-related ground-borne vibration or noise levels would impact to sensitive receptors.

Table 4.13-17: Typical Vibration Levels During Construction

Equipment	PPV (inches/second)	
	At 100 feet	At 300 feet
Bulldozer (Large)	0.011	0.006
Bulldozer (Small)	0.0004	0.00019
Loaded Truck	0.01	0.005
Jackhammer	0.005	0.002
Vibratory Roller	0.03	0.013
Caisson Drilling	0.01	0.006

Key:
PPV = peak particle velocity

Once project construction is complete, it is not expected that ongoing operational activities would result in any ground-borne vibration or noise impacts to sensitive uses. Therefore, the proposed project would not expose sensitive receptors to excessive ground-borne vibration or noise levels, and impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.13-3: 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?

The project site is not located within 2 miles of a public airport or private airstrip. The Elk Hills Buttonwillow Airport is located approximately 4 miles northeast of the project site. No impact would occur.

Mitigation Measures

No mitigation measures are required.

Level of Significance

No impact would occur.

4.13.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development, including wells and abandonment activity to implement carbon capture and storage projects, constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022, (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The aforementioned documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year County wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate Bill [SB] 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts on noise receptors is considered the project site plus a 5-mile radius. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on noise receptors. This geographic scope of analysis is appropriate because noise receptors within this area are expected to be similar to those in the project site because of their proximity and similar environments would result in similar land-use—and thus, site types.

Impact 4.13-4: Contribute to Cumulative Noise Impacts

With regard to noise, the project has the potential to contribute significantly to cumulative impacts within the study area. A complete analysis and evidence for the records of the cumulative impacts of the various noise generating activities from oil and gas are provided in Section 4.12, *Noise* (2021 SREIR). Since oil and gas activities could occur anywhere in the project area, the combined noise levels from the proposed project and existing or reasonably foreseeable projects depend on the proximity of oil and gas activities to other noise sources at a specific location. Noise generated from construction of wells authorized under the project, conservatively assuming use of the largest exploratory deep drilling rig (Kenai Rig), could be in excess of 65 dBA CNEL up to 4,000 feet from a construction site. Therefore, significant noise impacts would occur if there are sensitive noise receptors within 4,000 feet of the construction of a well. Other projects with construction or operations occurring concurrently with construction or operations of a well would also contribute to noise levels experienced by nearby sensitive noise receptors.

Other projects associated within the study area would also have to comply with the Kern County Noise Ordinance and/or the Noise Element of the KCGP and, therefore, would have to ensure noise levels do not exceed standards. Project activities would have to implement MM 4.13-1 if there are sensitive human noise receptors within 4,000 feet of a well to ensure that the noise levels do not exceed 65 dBA at the nearest exterior wall of the nearest sensitive receptor or more than 1 dBA higher than the ambient noise levels, if in excess of 65 dBA. The background noise level of the project is an active oilfield with multiple owners. The potential contribution of these few injection and monitoring wells as an impact on sensitive receptors more than 4 miles away for operations and 2-4 miles away for construction are not cumulatively considerable. With MM 4.13-1 which

requires adherence to the noise standards and provides performance standards as well as monitoring, cumulative impacts remain due to noise from nearby oil and gas development. Therefore, although the project's cumulative contribution to noise is minor, cumulative impacts remain significant and unavoidable.

Mitigation Measures

Implement MM 4.13-1 as described above.

Level of Significance After Mitigation

Cumulative impacts would be significant and unavoidable.

Section 4.14

Population and Housing

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Section 4.14

Population and Housing

4.14.1 Introduction

This section of the Environmental Impact Report (EIR) describes the environmental setting and regulatory settings for population, employment, and housing. It also describes the impacts on population and housing that would result from implementation of the California Resources Corporation's (project proponent) proposed Carbon TerraVault 1 (Kern County) Project (project). The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft and approximately 4 miles from the unincorporated community of Buttonwillow.

A description of the environmental setting for population and housing is presented below in Section 4.14.2, *Environmental Setting*, including discussion of the regional and local housing trends and employment trends. The regulatory setting applicable to population and housing is presented in Section 4.14.3, *Regulatory Setting*, and Section 4.14.4, *Impacts and Mitigation Measures*, discusses project impacts and associated mitigation measures.

4.14.2 Environmental Setting

Population

Kern County (County) is California's third largest county, encompassing 8,202 square miles. As of 2022, the county had a total population of 909,235 (Kern COG 2022a). The California Department of Finance (DOF) estimated that the total county population between 2010 and 2022 increased 3.5 percent, while population in the unincorporated areas increased by an estimated 11.5 percent (DOF 2021, 2023). The 2022 Kern County Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS) identifies future growth in the County as being driven by value-added agriculture, aerospace/defense, energy/natural resources, transportation logistics/manufacturing, and health care. Oil and renewable energy, such as wind and solar, primarily drove growth over the last decade. The Valley portion of the County produces over 75 percent of California's in-state oil and 58 percent of the state's total natural gas. Countywide, commercial-scale wind, solar, and distributed generation solar produce over 12,000 megawatts of electricity for use locally and throughout California. Value-added agriculture supported by alternative fuel production, such as biodiesel, made the County the largest agricultural-producing county in the nation for the first time in 2016.

The Kern County RTP/SCS projects that the population growth will average about 10,500 people per year with 1,186,600 people by 2046. The previously adopted 2015 forecast for the 2018 RTP assumed that the population growth would average about 21,900 people per year from 2015 to

2042. The new adopted forecast for the 2022 RTP predicts a significant 51 percent reduction in population growth compared to the 2018 RTP assumptions. Out-migration has driven the slowdown in population growth, exceeding natural increase (births minus deaths). In 2020–21, the County experienced a negative growth year because of prison closures, early release of prisoners, and people leaving the state because of high housing costs and concerns over the pandemic. Still, out of 58 counties in California, the County remains the 11th-most populated and is ahead of San Francisco County but behind Fresno County.

Regional and Local Housing Trends

In 2010, the County had a total of 284,367 housing units; in 2022, there were 305,853 units (DOF 2021, 2023). Approximately 93.4 percent of the 305,853 units were occupied, and 19,950 (or 6.5 percent) of the units were vacant in 2022 (DOF 2023). According to the U.S. Census Bureau, between 2017 and 2021, 58.3 percent of the housing units were owner occupied (U.S. Census Bureau 2021). Housing units and occupancy/vacancy rate trends for 2020 through 2022 are reflected in Table 4.14-1.

Table 4.14-1: Kern County Housing Trends

Area	Unit Count			Occupancy/Vacancy Rate		
	2020	2022	Percent Change	Occupied 2020	Occupied 2022	% Change
Incorporated	186,612	193,032	3.44	174,135/6.7%	184,357/4.5%	5.87/-2.2%
Balance of the County	115,268	112,821	-2.12	100,344/12.9%	101,546/10.0%	1.19/-2.9%
TOTAL	**301,880**	**305,853**	**1.32**	**274,479/9.1%**	**285,903/6.6%**	**4.16/-2.5%**

Source: DOF 2021, 2023

Existing housing and projected housing in the region and vicinity (including incorporated cities), as reported by the Kern County RTP/SCS, are presented in Table 4.14-2 (households) and Table 4.14-3 (housing units and households incorporated cities and surrounding areas).

Table 4.14-2: Estimated and Projected Housing Trends within Incorporated and Unincorporated Regional Statistical Areas

Area	2010	2013	2023	% Change 2013-2023
Greater Arvin Area	4,596	5,036	6,503	29.1
Unincorporated Greater Arvin Area	368	721	803	11.4
Metro-Bakersfield	168,373	178,842	217,548	21.6
Unincorporated Metro-Bakersfield	57,241	65,555	87,348	33.2
Greater Delano/McFarland Area	13,712	14,327	16,239	13.4
Unincorporated Greater	853	1,285	1,239	-3.6

Table 4.14-2: Estimated and Projected Housing Trends within Incorporated and Unincorporated Regional Statistical Areas

Area	2010	2013	2023	% Change 2013-2023
Delano/McFarland Area				
Greater Shafter Area	6,212	7,071	10,588	49.7
Unincorporated Greater Shafter Area	1,982	2,757	3,788	37.4
Greater Taft/Maricopa Area	6,189	6,578	7,863	19.5
Unincorporated Greater Taft/Maricopa Area	3,521	3,915	4,953	26.5
Greater Tehachapi Area	11,614	12,466	15,672	25.7
Unincorporated Greater Tehachapi Area	8,493	9,272	11,872	28.0
Greater Wasco Area	6,087	6,435	7,905	22.8
Unincorporated Greater Wasco Area	956	1,142	905	-20.8
TOTAL	**290,197**	**315,402**	**393,226**	**24.7**

Source: Kern COG 2014

Table 4.14-3: Estimated and Projected Housing Unit Trends within Incorporated Cities

	Housing Units				Households			
Area	2010	2013	2023	% Change 2013-2023	2010	2013	2023	% Change 2013-2023
City of Arvin	4,476	4,568	6,000	31.32%	4,228	4,315	5,700	32.1
City of Bakersfield	120,725	123,066	140,500	14.17%	111,132	113,287	130,200	14.9
Delano	10,713	10,831	12,500	15.41%	10,260	10,373	12,000	15.7
McFarland	2,683	2,755	3,100	12.52%	2,599	2,669	3,000	12.4
City of Shafter	4,521	4,612	7,200	56.11%	4,230	4,314	6,800	57.6
City of Taft	2,525	2,522	2,800	11.02%	2,254	2,251	2,500	11.1
City of Maricopa	466	464	500	7.76%	414	410	410	0.0
City of Wasco	5,477	5,649	7,400	31.00%	5,131	5,293	7,000	32.3
TOTAL	**151,586**	**154,468**	**180,000**	**16.53%**	**140,248**	**142,912**	**167,610**	**17.3**

Source: Kern COG 2014

Regional and Local Employment Trends

According to the California Employment Development Department, the County consistently ranks among the top five most-productive agricultural counties in the United States and is the 13th largest petroleum-producing county in the nation. Additionally, because of its unique geographic location, the County has also become a distribution location for some of the world's largest companies, with freight cargo going to and from the Ports of Los Angeles and Long Beach.

Between 2010 and 2022, the County's civilian labor force grew by 5.2 percent (372,200 and 391,700, respectively). The employed labor force grew by 16.1 percent between 2010 and 2022 (312,600 and 364,600, respectively) (State of California Employment Development Department 2021). The Kern Economic Development Corporation (KEDC) projects the fastest growing occupations within Kern County between 2018 and 2028 to be within the Education, Healthcare & Social Assistance industry and the Trade, Transportation and Utilities industry (KEDC 2023).

In 2022, the annual average number of individuals participating in the Kern County labor force was 387,500; of these, 360,500 were employed, leaving 27,000 actively looking for work, or an unemployment rate of 7 percent. Based on the KEDC 2023 Market Overview, industry employment in the County is projected to reach 382,900 by 2028, an increase of 9.4 percent over the 10-year period.

According to the Kern Council of Governments (COG) Regional Housing Data Report, there were 1.10 jobs per housing unit for incorporated areas of Kern County in 2010. That ratio increased to 1.18 in 2013 and was projected to decrease to 1.03 by 2023. Similarly, the ratio of jobs to housing units in unincorporated areas of Kern County was expected to decrease from 1.13 (2013) to 0.83 (2023) (Kern COG 2014).

4.14.3 Regulatory Setting

State

California Housing Element Requirement

California State law requires each city and county to adopt a general plan for future growth containing at least seven mandatory elements, including a housing element. The California Department of Housing and Community Development (HCD) plays the critical role of reviewing every local government's housing element to determine whether it complies with state law and submitting written findings back to each local government. HCD's approval is required before a local government can adopt its housing element as part of its overall General Plan. Jurisdictions can opt to update their housing elements every five years or every eight years. The option to use an eight-year schedule was created to better align with the schedule local governments (also known as "COGs" or metropolitan planning organizations) have to meet to update their Regional Transportation Plans, which are updated every four years and are now mandated to align with

housing plans in Regional Sustainable Communities Strategies. California's housing element requirement acknowledges that, in order for the private market to adequately address the housing needs and demand of Californians, local governments must adopt plans and regulatory systems that provide opportunities for (and do not unduly constrain) housing development. As a result, housing policy in California rests largely on the effective implementation of local general plans and, in particular, local housing elements (HCD 2022).

Housing elements in general plans must identify housing needs for all economic segments. The plans must also provide opportunities for housing development to meet existing and projected housing needs, including a fair share of the regional housing need. At the state level, the HCD estimates the relative share of California's projected population growth that could occur in each county in the state based on DOF population projections and historic growth trends. Where there is a regional COG, as in Kern County, the HCD provides the regional housing need to the COG. The COG then assigns a share of the regional housing need to each of its cities and counties in the region. The process of assigning shares provides cities and counties the opportunity to comment on the proposed allocations. The HCD oversees the process to ensure that the COGs distribute their share of the state's projected housing need.

Before adopting an update to its housing element, the city or county must submit a draft to the HCD for review. The HCD advises the local jurisdiction as to whether its housing element complies with the provisions of California's Housing Element Law.

The COGs are required to assign regional housing shares to the cities and counties within their regions on a similar five-year schedule. At the beginning of each cycle, the HCD provides population projections to the COGs, which then allocate shares to their cities and counties. The shares of the regional need are allocated before the end of the cycle so that the cities and counties can amend their housing elements by the deadline.

Regional

2022 Regional Transportation Plan/Sustainable Communities Strategy

On July 21, 2022, the Kern Council of Governments (COG) adopted the 2022 RTP/SCS for the Kern region, including Chapter 4, the SCS, which implements Senate Bill (SB) 375, California's Sustainable Communities and Climate Protection Act. The SCS integrates transportation planning, greenhouse gas reductions from passenger vehicles and light-duty trucks, and regional housing needs with a forecasted development pattern that acknowledges the County's and incorporated cities' general plan programs.

The SCS acknowledges the importance of energy resources, including oil and gas production, as an important resource and industry to Kern County's economy and future growth.

Local

Kern County General Plan

The project site is located within the Kern County General Plan (KCGP) boundary; therefore, would be subject to applicable policies and measures of the KCGP. The land use, conservation, and open space element and the Energy Element of the KCGP include goals, policies, and implementation measures related to population and housing. As the project site is located on an existing oilfield far from an urbanized community, no policies related to population and housing apply to the project. There are more general policies that do apply, no matter the specifics of the project, as listed below.

1.10. General Provisions

Goals

Goal 1. Ensure that the County can accommodate anticipated future growth and development while maintaining a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.

Policies

Policy 6. The County shall ensure the fair treatment of people of all races, cultures, incomes, and age groups with respect to the development, adoption, implementation, and enforcement of land use and environmental programs.

1.10.9. Economic Development

Policies

Policy 58. Support and work toward the elimination of disincentives for business and industry to prosper in Kern County and create special economic development programs to encourage commerce and industry to locate in Kern County.

Policy 62. Periodically review and update procedures for granting development approvals and permits and facilitate the processing of land use entitlements.

Implementation Measures

Implementation Measure DD. Utilize the County's Economic Strategy and the Economic Incentive Program to promote economic growth and to maintain a strong local economy.

Chapter 5. Energy Element

5.3.2. Kern County's Economic Dependence on the Oil Marketplace

Goals

Goal. To reduce the County's susceptibility to fluctuations in the petroleum production levels, and to encourage diversification of the economy.

Policies

Policy 3. The County shall encourage the conversion of existing petroleum-related facilities to other productive uses when they are no longer needed or productive.

Policy 4. The County should encourage the development of renewable energy industries to diversify the energy economy in Kern County.

Kern County General Plan, Housing Element 2015–2023, Adopted April 26, 2016

The Housing Element is a separate element of the KCGP. Each city and county is required by California housing law to develop a housing element, one of the seven general plan elements, to qualify for allocation of state regional housing funding. To receive regional housing funds, each city and county must update its general plan housing element on a regular basis (generally, every five to eight years). The housing element must incorporate policies and identify potential sites that would accommodate the city or county's share of the regional housing needs. The County adopted its current Housing Element (2015–2023) on April 26, 2016 (Kern County 2016). The Sixth Cycle Kern County Housing Element (2024–2031) is currently in public review with adoption required by April 2024 (Kern County 2023). Because the project would not include new housing, the goals and policies of the Housing Element do not apply to the project.

4.14.4 Impacts and Mitigation Measures

Methodology

Population, housing, and employment in the area were evaluated by reviewing the most current data available from the U.S. Census Bureau, California DOF, KCGP, KEDC, and the Kern COG.

Thresholds of Significance

The County's California Environmental Quality Act (CEQA) Implementation Document and Environmental Checklist identify the following criteria, as established in Appendix G of CEQA Guidelines, to determine whether a project could potentially have a significant adverse effect on population and housing. A project could have a significant adverse effect on recreation if it would:

- Induce substantial 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).

- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

Project Impacts

The types of potential impacts related to population and housing is generally the same for construction and operational activities, each of which requires a workforce of experienced employees. Accordingly, the impacts assessment applies to both project construction and operation.

Impact 4.14-1: Induce Substantial 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)

As described in Chapter 3, *Project Description*, construction of the project would require approximately 80 workers daily during the peak construction period. The presence of construction workers at the project site would be temporary, over the duration of the approximate two-year construction period. Construction workers would likely come from an existing local or regional construction labor force and would not likely relocate their households as a consequence of working on the project. Therefore, the short-term increased employment of construction workers on the project site would not result in a notable increase in the residential population of the area surrounding the project site.

Once construction is completed, the project would include five full-time employees, who would operate the facility seven days a week, 24 hours a day. An additional five full-time employees could be on-site at any time if repairs or other maintenance work is required. Given the scope of the existing population and available housing in the area, a potential increase in population would be minimal, and would not be significant. Consequently, the project would not create a significant number of jobs or directly induce: (1) substantial population growth or (2) the development of any new housing, businesses, or infrastructure during construction or operation.

Construction and operation of the proposed project would not result in a significant increase or the availability of new jobs. In addition, the project does not propose the extension of roads or the development of other infrastructure, such as utilities that would indirectly induce population growth. Therefore, the project would not induce growth, and impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.14-2: Displace Substantial Numbers of Existing Housing or People, Necessitating the Construction of Replacement Housing Elsewhere

As previously mentioned, the surrounding project area is composed of agricultural fields, both active and fallow, and other existing oilfields. The closest urbanized areas to the project site are located approximately 4 miles away, within the boundaries of the unincorporated community of Buttonwillow. The project would not require the removal or displacement of any residential structures or inhabitants; therefore, no housing would be displaced, and the project would not require construction of replacement housing elsewhere. No impact would occur.

Mitigation Measures

No mitigation measures are required.

Level of Significance

No impact would occur.

4.14.5 Cumulative Setting Impacts and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project, together with the impacts of past, present, and reasonably foreseeable future oil and gas development, including wells and abandonment activity to implement carbon capture and storage projects, constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells countywide per year of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, SB 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020,

2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the County permits) since 2019. The analysis in the previous EIR documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to population and housing is the County. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on population and housing. This geographic scope of analysis is appropriate because population and housing in the County is expected to be similar to those in the project site because of their proximity.

Impact 4.14-3: Contribute to Cumulative Population and Housing Impacts

With regard to population and housing impacts, the project does not have the potential to contribute significantly to cumulative impacts within the County. A complete analysis of the cumulative impacts relative to population and housing from oil and gas activities are provided in Section 4.12, *Population and Housing,* of the Oil and Gas EIR.

In addition, the County is expected to continue to grow, with or without the proposed project, consistent with the growth projections included in the 2022 Kern COG RTP/SCS and accompanying EIR.

The proposed project would not be expected to result in any substantial increase in population or in housing demand or require the displacement of substantial residences or people and construction of relocated housing, in the County. Accordingly, less than significant impacts would occur because of the project. Displacement of and demand for housing and changes in the local labor market and population would not contribute to cumulatively considerable impacts.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Cumulative impacts would be less than significant.

Section 4.15

Public Services

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Section 4.15

Public Services

4.15.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for public services, which includes fire protection, law enforcement services, schools, emergency medical services, and community health centers. This section also describes the impacts on public services that would result from implementation of California Resources Corporation's (project proponent) proposed Carbon TerraVault 1 (Kern County) Project (project). The project site within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the city of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow in western Kern County, California.

A description of the environmental setting (affected environment) for public services is presented below in Section 4.15.2, *Environmental Setting*, including discussion of the public service providers and facilities. The regulatory setting applicable to public services is presented in Section 4.15.3, *Regulatory Setting*. Section 4.15.4, *Impacts and Mitigation Measures*, includes a discussion of project impacts and associated mitigation measures, if necessary.

For impacts to parks and other recreational facilities, please refer to Section 4.15, *Recreation*.

4.15.2 Environmental Setting

Kern County (County) is geographically California's third largest county, encompassing 8,202 square miles at the southern end of the Central Valley. The project area is bounded by Kings and Tulare Counties to the north, Santa Barbara and San Luis Obispo Counties to the west, the Tehachapi Mountains and the Sierra Nevada Mountains to east, and the northern boundary of the Los Padres National Forest to the south.

Fire Protection

Local

Fire protection in Kern County is a cooperative effort. The Kern County Fire Department (KCFD) provides firefighting services to many cities throughout the County. In addition, operating agreements with the U.S. Forest Service, U.S. Department of the Interior, Bureau of Land Management, U.S. Fish and Wildlife Service, and the California Department of Forestry and Fire Protection (CAL FIRE) also provide wildland fire protection.

According to the KCFD's 2021 Strategic Fire Plan, the project site is within battalion 2, Western Kern (KCFD 2022). Battalion 2 and the following authorities are responsible for firefighting in this

Fire Management Area: Bureau of Land Management, Department of Defense, U.S. Fish and Wildlife Service, and the local KCFD.

Locally, the project site falls within the fire protection authority of the KCFD. The KCFD provides fire protection services for the 8,000 square miles of unincorporated areas of Kern County and the cities of Arvin, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi, and Wasco. KCFD has 47 full-time fire stations and one seasonal station. KCFD is broken into seven battalions for operational management; each battalion covers a large geographical area and includes seven to nine fire stations. In total, KCFD provides fire protection services for citizens living in cities of Arvin, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi, and Wasco, as well as 500,000 citizens living in unincorporated areas of Kern County. As of 2023, there are seven battalions, 47 fire stations, 58 engines, six ladder trucks, 54 patrols, 30 command vehicles, two hand crews, two helicopters, three hazardous materials response teams, two technical rescue teams, and one oil fire foam tender (KCFD 2023a). KCFD has 14 Mutual Aid Agreements with neighboring fire suppression organizations to further strengthen the emergency services available to residents. According to the City of Bakersfield Fire Information Map (City of Bakersfield 2023), the project site is served by Fire Station Numbers 24 (McKittrick) and 25 (Buttonwillow).

The Emergency Communications Center for KCFD is located in the Whiting Communications Center in Northeast Bakersfield (KCFD 2023b). The Emergency Communications Center is responsible for dispatching resources over an area of more than 8,000 square miles that includes 65 fire stations.

State/Pipeline Safety Division at the Office of State Fire Marshal

The Pipeline Safety Division at the Office of State Fire Marshal (OSFM) regulates the supercritical and hazardous liquid pipelines pursuant to 49 CFR Part 195 and the California Elder Pipeline Safety Act of 1981, as amended in 2022. Specifically, the OSFM is an agent to enforce the 49 CFR part 195 regulation on *intrastate* hazardous liquid pipelines. According to Part 195.2, carbon dioxide (CO_2) means a fluid consisting of more than 90 percent CO_2 molecules compressed to a supercritical state. Hence, the OSFM only regulates CO_2 pipelines with a concentration of more than 90 percent of CO_2 compressed to a supercritical state under the federal program. Currently, the OSFM does not regulate pipelines transporting CO_2 as a gas or liquid under the federal program.

Law Enforcement Protection

California Highway Patrol

The California Highway Patrol (CHP) provides traffic regulation enforcement, oversees response to emergency incidents on California's highways or assists other public agencies responding to emergency incidents, and promotes the safe and efficient movement of people and goods on California highways to minimize loss of life, injuries, and property damage. CHP officers patrol state highways and implement the CHP's other law enforcement activities (e.g. drug interception, vehicle theft investigation and prevention, vehicle inspections, accident investigations, and public

awareness campaigns), with the support of the non-uniformed personnel assigned to area and division offices.

The CHP has eight divisions that provide services throughout California. Kern County is located in both the Central and Inland Division service areas (CHP 2023a). The CHP has three offices in the vicinity of the project site which are part of the CHP's Central Division, including one in Bakersfield, one in Buttonwillow, and one in Lebec (see Table 4.15-1). The Central Division includes the San Joaquin Valley and extends south into the Grapevine, a portion of Interstate 5 that climbs out of the San Joaquin Valley and into the Los Angeles Basin (CHP 2023b).

Table 4.15-1: California Highway Patrol Area Offices in the Vicinity of the Project Site

CHP Office Number	Name	Address
(426)	Buttonwillow	29449 Stockdale Hwy Bakersfield, CA 93314
(420)	Bakersfield	9855 Compagnoni Street Bakersfield, CA 93313
(430)	Fort Tejon	1033 Lebec Road Lebec, CA 93243

Source: CHP 2023c
Key:
CHP = California Highway Patrol

Kern County Sheriff's Office

The Kern County Sherriff provides police protection services to the unincorporated portions of the County. The Kern County Sheriff is the County's chief law enforcement officer. The Kern County Sheriff's Office has 1,202 sworn and civilian employees. There are 567 authorized deputy sheriff positions deployed in patrol, substation, detective, courts services, and special investigations units (KCSO 2023a). The Kern County Sheriff's Office provides protection for the unincorporated areas of Kern County and has a contract arrangement with some incorporated areas. The Kern County Sherriff's headquarters is located in Bakersfield and consists of 15 substations that provide patrol services to remote areas of Kern County, such as the desert and mountainous regions as well as other areas that need law enforcement services. The Buttonwillow substation is the closest to the project site.

The average response times for the Kern County Sheriff's Office are 7 minutes 24 seconds for emergency in-progress calls (e.g. a crime that is under way and/or a life-or-death situation), 14 minutes 25 seconds for non-emergency in-progress calls (e.g. a crime that has already occurred and/or an incident that is not life-threatening), and 28 minutes 23 seconds for report calls (reporting a crime that is not in progress) (Pruitt 2014).

The Metro Patrol Division of the Kern County Sheriff's Office has eight sergeants, 67 deputies, seven senior deputies, and eight civilian support staff. The Kern County Sheriff's Office Metro Patrol Division covers four zones within the city of Bakersfield. The four zones cover 600 square miles, but this area does not include the outlying areas where the substations provide services

(KCSO 2023b). The Rural Crimes Investigation Unit addresses property crimes in the agricultural, ranch, and oilfield portions of the County.

Schools

The County is served by 46 K-12 school districts (KCSS n.d.[a]). The project site is within the McKittrick, Buttonwillow, and Elk Hills school district boundaries (KCSS n.d.[b]). In addition to Kern County's K-12 school districts, the County includes a number of private schools and home or independent study programs. Adult colleges in Kern County include Bakersfield College, California State University, Bakersfield, Taft College, and Cerro Coso Community College. The project site is not within the vicinity of any colleges.

The closest schools to the project site are McKittrick Elementary School, Buttonwillow Elementary School, and Elk Hills Elementary School. These schools are located approximately within 3 miles of the Conditional Use Permit (CUP) boundary, and specific distances to each project element are listed in Table 4.15-2.

Table 4.15-2: Schools in the Vicinity of the Project Site

School Name	Student Population (2022–2023)	District	Distance to CCS Surface Land Area CUP Boundary (miles)	Distance to Injection Well (miles)	Distance to Underground Facility Pipeline (miles)
McKittrick Elementary School	79	McKittrick Elementary	2.78	4.47	4.47
Buttonwillow Elementary School	313	Buttonwillow Union Elementary	4.85	6.15	5.81
Elk Hills Elementary School	163	Elk Hills Elementary School	4.21	6.05	6.05
Midway Elementary	85	Midway Elementary	7.04	8.11	7.98
Jefferson Elementary	243	Taft City	6.73	8.15	8.13
Taft Primary	247	Taft City	7.61	9.02	9.01
Roosevelt Elementary	475	Taft City	7.29	8.65	8.63
Parkview Elementary	330	Taft City	8.00	9.45	9.35

Table 4.15-2: Schools in the Vicinity of the Project Site

School Name	Student Population (2022–2023)	District	Distance to CCS Surface Land Area CUP Boundary (miles)	Distance to Injection Well (miles)	Distance to Underground Facility Pipeline (miles)
Conley Elementary	312	Taft City	8.48	9.95	9.87
Lincoln Junior High	795	Taft City	7.28	8.75	8.63
Taft Union High	1,102	Taft Union High	7.36	8.83	8.78
Buena Vista High (Continuation)	84	Taft Union High	7.10	8.59	8.54
Taft College	3,943	West Kern Community College	7.15	8.51	8.55

Key:
CCS = carbon capture and storage
CUP = Conditional Use Permit

Parks

Please see information regarding park and recreation facilities in Section 4.15, *Recreation*.

Other Public Facilities

There are over 60 community health centers, health clinics, ambulatory surgical centers, and hospitals within the region. The following are hospitals in the region that have emergency rooms:

- Bakersfield Heart Hospital, Bakersfield
- Bakersfield Memorial Hospital, Bakersfield
- Delano Regional Medical Center, Delano
- Kern Medical Center, Bakersfield
- Mercy Hospital, Bakersfield
- Mercy Southwest Hospital, Bakersfield
- Ridgecrest Regional Hospital, Ridgecrest
- San Joaquin Community Hospital, Bakersfield

The Kern Medical Center also has a trauma center. A Community Health Needs Assessment was prepared for Kern County in 2019 (Healthy Community Institute and Strategy Solutions 2019) through a collaborative effort of the Kern County Community Benefit Collaborative, and is comprised of Delano Regional Medical Center, Dignity Health (Mercy and Memorial Hospitals), Kaiser Permanente, and San Joaquin Community Hospital. The Community Health Needs Assessment was conducted to identify primary health issues, status, and needs, and enable providers to establish priorities, development interventions, and to direct resources to improve the health of Kern County residents. The closest health care facility to the project site is located approximately 30 miles away in Bakersfield.

The Kern County Emergency Medical Services (EMS) Department is the lead agency for the EMS system in Kern County. EMS is responsible for coordinating all system participants, which include the public, emergency service providers, and hospitals throughout the County. The department provides training programs for EMS such as certification and recertification for local EMS personnel. It includes communications services, including EMS dispatch. Transportation services include ambulance service monitoring and system compliance, service areas and performance standards, and status of EMS transportation systems. The County has been divided into nine geographic regions. Each region, or Exclusive Operating Area or Operating Area, has been assigned to one ambulance provider. The project site is located within the Operating Area 9, which covers Taft, Maricopa, McKittrick, and surrounding unincorporating areas (CEMSA 2019).

Other public services include over 25 federal post offices and city and County libraries. The County library system is divided into two districts: Greater Bakersfield Area and Outside Bakersfield Area. Greater Bakersfield Area has seven branch libraries, plus a bookmobile and the Olive Drive Fire Research Center. Outside Bakersfield Area has 13 branches, plus a bookmobile.

The closest post office is located at 23263 2nd Street in McKittrick, approximately 2.95 miles west of the western portion of the project site. The Buttonwillow Library is the closest library, located at 101 N Main Street in Buttonwillow, approximately 5 miles northeast of the western portion of the project site.

4.15.3 Regulatory Setting

Federal

No federal regulations, plans, or public service standards applicable to the project have been identified.

State

The California Department of Forestry and Fire Protection

Under Title 14 of the Natural Resources of the California Code of Regulations (CCR), CAL FIRE has the primary responsibility for implementing fire wildlife planning and protection for State Responsibility Area (SRA) lands. CAL FIRE develops fire safe regulations and issues fire safe

clearances for land within a fire district of SRA. More than 31 million acres of California's privately owned wildlands are under the jurisdiction of CAL FIRE through the CAL FIRE Resource Management Program. CAL FIRE provides emergency services in 36 of the State's 58 counties via contracts with local governments (CAL FIRE 2022).

In addition to wildland fires, CAL FIRE's planning efforts involve responding to other types of emergencies that may occur on a daily basis, including residential or commercial structure fires, automobile accidents, heart attacks, drowning victims, lost hikers, hazardous material spills on highways, train wrecks, floods, and earthquakes.

Under Title 24, Regulations Development, the Office of the State Fire Marshal is responsible for promulgating regulations that promote fire and life safety for inclusion into the State Building Codes, including the California Building Code, California Fire Code, California Electrical Code, California Mechanical Code, California Plumbing Code, and California Historical Building Code. These documents are also referred to as CCR, Title 24. The process incorporates a great deal of public participation and is guided by the State Building Standards Law.

California Occupational Safety and Health Administration

In accordance with CCR, Title 8, Sections 1270, Fire Prevention, and 6773, Fire Protection and Fire Equipment, the California Occupational Safety and Health Administration has established minimum standards for fire suppression and EMS. The standards include, but are not limited to, guidelines on the handling of highly combustible materials, fire hosing sizing requirements, restrictions on the use of compressed air, access roads, and the testing, maintenance, and use of firefighting and emergency medical equipment.

Local

Kern County General Plan

The project is located within the Kern County General Plan (KCGP) (Kern County 2009) area; therefore, would be subject to applicable policies and measures of the KCGP. The Land Use, Conservation, and Open Space Element and the Safety Element of the KCGP include goals, policies, and implementation measures related to public safety that apply to the project, as described below.

Chapter 1. Land Use, Conservation, and Open Space Element

1.4. Public Facilities and Services

Goals

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 project.

1.4.1. Public Facilities and Services

Policies

Policy 1. New discretionary development will be required to pay its proportional share of the local costs of infrastructure improvements required to service such development.

Policy 3. Individual projects will provide availability of public utility service as per approved guidelines of the serving utility.

Policy 6. The County will ensure adequate fire protection to all Kern County residents.

Policy 7. The County will ensure adequate police protection to all Kern County residents.

Implementation Measures

Implementation Measure A. Continue to administer the Capital Improvement Program (CIP) and coordinate with public utility providers listing the necessary improvements to Kern County's public services and facilities in collaboration with key service providing agencies and the County Administrative Office as a first step toward the preparation of a long-term Public Services Plan for Kern County. This plan addresses the projected demand for public services throughout the County in comparison with projected revenues and identifies long-term financial trends for the major public service providers. The CIP and General Plan can assure compliance with the provisions of Government Code Sections 65401 and 65402 which require review of all capital facility decisions for consistency with this General Plan.

Implementation Measure B. Determine local costs of County facility and infrastructure improvements and expansion which are necessitated by new development of any type and prepare a schedule of charges to be levied on the developer at the site of approval of the Final Map. This implementation can be effectuated by the formation of a County work group.

Implementation Measure J. Ensure that the Superintendent of Schools and the respective school districts are informed of development proposals and are afforded the opportunity of evaluating their potential effect on the physical capacity of school facilities.

Implementation Measure L. Prior to the approval of development projects, the County shall determine the need for fire protection services. New development in the County shall not be approved unless adequate fire protection facilities and resources can be provided.

1.10. General Provisions

Goals

Goal 1. Ensure that the County can accommodate anticipated future growth and development while maintaining a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.

1.10.1. Public Services and Facilities

Policies

Policy 9. New development should pay its pro rata share of the local cost of expansions in services, facilities, and infrastructure which it generates and upon which it is dependent.

Policy 15. Prior to approval of any discretionary permit, the County shall make the finding, based on information provided by the California Environmental Quality Act documents, staff analysis, and the applicant, that adequate public or private services and resources are available to serve the proposed development.

Policy 16. The developer shall assume full responsibility for costs incurred in service extensions or improvements that are required to serve the Project. Cost sharing or other forms of recovery shall be available when the service extensions or improvements have a specific quantifiable regional significance.

Chapter 4. Safety Element

4.6. Wildland and Urban Fire

Policies

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 6. All discretionary projects shall comply with the adopted Fire Code and the requirements of the Fire Department.

Implementation Measures

Implementation Measure A. Require that all development comply with the requirements of the KCFD or other appropriate agency regarding access, fire flows, and fire protection facilities.

Kern County Fire Code

Kern County has adopted, by reference, portions of the California Building Standards Code and the Uniform Fire Code, with modifications and amendments, in Chapter 17.32 of the Kern County Code of Building Regulations (Fire Code). The purpose of this code is to prescribe the minimum requirements necessary to establish a reasonable level of fire safety to protect life and property from hazards created by fire, explosion, and dangerous conditions.

The Kern County Fire Code defines a hazardous fire area as any land that is covered with grass, grain, brush, or forest and situated (e.g. in an inaccessible location) so that a fire originating upon such land would present an abnormally difficult job of suppression and would result in great and unusual damage through fire or the resulting erosion.

Kern County Fire Department Strategic Fire Plan

The KCFD's 2021 Strategic Fire Plan was developed collaboratively between federal, state, city, and County agencies to identify and prioritize pre-fire and post-fire management strategies and tactics meant to reduce the loss of values at risk within the department. The plan is designed to be an assessment and planning tool only and is the responsibility of those implementing the projects to ensure that all environmental compliance and permitting processes are met as necessary (KCFD 2022).

Kern County Fire Department Wildland Fire Management Plan

The KCFD Wildland Fire Management Plan adopted in 2009 assesses the wildland fire situation throughout the SRA within the county. The Plan includes stakeholder contributions and priorities and identifies strategic targets for pre-fire solutions as defined by the people who live and work within the local fire problem. The plan systematically assesses the existing levels of wildland protection services and identifies high-risk and high-value areas, which are potential locations for costly and damaging wildfires. The plan also ranks the areas in terms of priority needs (KCFD 2009).

Kern County Multi-Jurisdiction Hazard Mitigation Plan

The purpose of the multi-hazard mitigation plan is to reduce or eliminate the long-term risk to people and property from natural hazards and their effects in the County. The 2019–20 Update to the Plan is to help Kern County become less vulnerable to losses from future disasters (KCFD 2020). The multi-jurisdictional plan includes the County and the incorporated municipalities of Arvin, Bakersfield, California City, Delano, Maricopa, Ridgecrest, Shafter, Taft, Tehachapi, and Wasco. The County also encompasses areas of land controlled by Federal and State land management agencies, including the CAL FIRE, Bureau of Land Management, and Bureau of Reclamation. While other levels of government have jurisdiction in these parts of the County, the Hazard Mitigation Plan could also be used to document and coordinate mitigation efforts among Federal, State, and local jurisdictions. This plan also covers 49 special districts that include school, airport, community service, water, recreation and park, sanitation, and other districts. Among the items assessed, the plan evaluated the risks associated with seismic events, dam failure, severe weather, and wildfire on oil and gas facilities (KCFD 2020).

Capital Projects and Major Maintenance

The General Services Division annually distributes a major maintenance and capital project submission and processing timeline. The timeline is accompanied by a list of projects previously requested by departments. The departments are required to (1) delete any projects no longer deemed necessary; (2) add any new project request; (3) indicate if a project is being revised; and (4) establish the department's prioritization of the projects. The General Services Division performs

an initial screening of all projects to establish a preliminary priority. For those projects that are given preliminary priority as well as for revised projects, cost estimates are then generated. The list of prioritized projects is provided to the County Administrative Office for budgetary consideration. The FY 2021-2022 Recommended Budget included $26.4 million as part of the American Rescue Plan. No additional projects are included in the FY 2022-2023 Recommended Budget (KCCAO 2022).

Each year the county assesses the need for capital improvements in accordance with the county's capital policy. This policy provides guidance for the county's approach to planning of capital projects. The projects identified in this process include improvements to or acquisition of land and facilities. Certain recurring capital or infrastructure projects, such as roads, bridges, and sewer are reviewed separately and budgeted in the applicable operating fund (roads or sanitation districts). The General Fund Major Maintenance budget unit enables the county to capitalize major maintenance projects that meet the capitalization requirements per accounting rules, which are considered routine maintenance but require capitalization and are funded through the originating departmental operating budget or through an allocation of Net General Fund.

To the extent possible and under current policy, the county uses one-time funding or fund balance to fund one-time expenses such as capital projects in order to mitigate impacts to operations. The amount of discretionary General Fund resources for capital projects varies annually based on available one-time funding. As a result of limited resources, the county has prioritized major maintenance or capital improvements of existing structures and improvements over new capital projects.

4.15.4 Impacts and Mitigation Measures

Methodology

The methodology used to evaluate potential public services impacts includes the following: (1) evaluation of existing fire and police services and personnel for the fire and law enforcement stations serving the project site, (2) determination of whether the existing fire and law enforcement services and personnel are capable of servicing the project, in addition to the existing population and building stock, and (3) determining whether the project's contribution to the future service population would cause fire or police station(s) to operate beyond service capacity. The determination of the significance of the project on public services considers the ability of the service providers to provide and maintain acceptable levels of service, which in turn would require the construction of new or expansion of existing facilities. The methodology for this analysis included a review of published information pertaining to KCFD and KCSO.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist identify the following criteria, as established in Appendix G of the CEQA Guidelines, to determine if a project could potentially have a significant adverse effect on public services.

A project could have a significant adverse effect on public services if it would:

a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

   i. Fire Protection

   ii. Police Protection

   iii. Schools

   iv. Parks

   v. Other Public Facilities

Project Impacts

Impact 4.14-1: The project would result in the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection services or police protection services.

Fire Protection

Construction and Decommissioning Impacts

An average daily construction workforce would vary depending on the type of activities underway. A maximum of approximately 80 workers daily during the peak construction period would be required. The presence of the construction workers would be temporary and anticipated to last approximately 24 months for the project construction period.

The project site is located within a State Responsibility Area (SRA) and a Federal Responsibility Area (FRA) (CAL FIRE 2022). The project site is not located within a Very High Fire Hazard Severity Zone (VHFHSZ) (CAL FIRE 2022). The nearest SRA VHFHSZ is located approximately 8 miles southwest of the project site. The project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires (refer to Section 4.18, *Wildfire*).

Fire protection requirements are based on the number of residents and workers in the KCFD service areas. As the number of residents and workers increases, so does the number of emergency medical calls. Therefore, service demand is primarily tied to population, not building size, because emergency medical calls typically make up most responses provided by the fire department. The project does not include any residential uses. Construction workers are expected to travel to the project site from population centers such as Tehachapi and Rosamond, and the number of workers

expected to relocate to the surrounding area is not expected to be substantial. If temporary housing should be necessary, it is expected that accommodations would be available in nearby communities, such as Buttonwillow and Taft. Therefore, no residents would occupy the project site and an increase in service demands as a result of an increase in residential uses would not occur.

The addition of construction personnel on the project site could result in an increase in demand for fire protection services. While this would be an increase above existing levels, the presence of construction workers on the site would be temporary, as the construction period for the project is anticipated to last approximately 24 months. Although construction would be temporary and short term, fire hazards from the project would potentially increase the need for fire response or emergency services during the construction period. However, as required by Mitigation Measure (MM) 4.9-18 the project proponent would prepare and implement an emergency response plan that would contain notification procedures and emergency fire precautions consistent with the 2022 California Fire Code and Kern County Fire Code. The plan would be for use during the construction period and would include emergency fire precautions for vehicles and equipment, as well as implementing fire rules and trainings so temporary employees are equipped to support handling fire threats. Given the temporary nature of the project's construction and decommissioning, no substantial increase in fire protection services and/or facilities would occur during project construction. No new or physically altered KCFD or CAL FIRE facilities would be required to accommodate the proposed project during construction; therefore, construction-related impacts would be less than significant.

Operation

The project site would be properly operated, maintained, and inspected in accordance with the applicable regulatory requirements as detailed in Section 4.15.3, *Regulatory Setting,* above. These regulations specify the types and frequencies of safety inspections and maintenance to be performed. Furthermore, the project would be required to comply with its emergency response plan, as described in MM 4.9-18 (see Section 4.9, *Hazards and Hazardous Materials*). The project would include five full-time employees which will operate the facility seven days a week, 24 hours a day. An additional five full-time employees could be on-site at any time if repairs or other maintenance work is required. The project site would be monitored 24 hours a day, seven days a week, 365 days a year by an automated monitoring and infrared monitoring system for the underground facility pipeline, including automatic shutdown for potential leak scenarios. The monitoring and leak detection system is described in detail in Section 3.7.4, *Project Description*.

Although unlikely, operational activities could introduce fire risks to the project site through use of mechanical equipment, electrical facilities, generators, etc. However, all CCS operational activities would be required to comply with the emergency response plan implemented per MM 4.9-18, which would help reduce fire risks on site. In addition, all project facilities would have been designed and constructed in accordance with the current California Fire Code and Kern County Fire Code such that fire hazards are reduced and/or avoided. Combustible vegetation on and around the proposed facilities would be actively managed by the project owner during both the construction and operation phases to minimize fire risk. Combustible products would be either limited in height or removed primarily through a combination of dirt or gravel firebreaks, grazing, and mowing.

Furthermore, a Vegetation Management Plan would be implemented during operations to guide the use of tools such as grazing and mowing to help manage accumulation of potential fine fuels around project infrastructure. The proposed project would include fire breaks around the site boundary in the form of compacted dirt or gravel breaks and access driveways subject to Kern County standards.

No new or physically altered KCFD or CAL FIRE facilities would be required to accommodate the proposed project. However, the project could increase demand for fire protection services in the future; thereby necessitating additional staff or construction of new facilities; therefore, impacts would be potentially significant and MM 4.15-1 through MM 4.15-5 would be required.

Law Enforcement Protection

Construction and Decommissioning

As described above in Section 4.15.2, *Environmental Setting*, the KCSO provides primary law enforcement protection services for the project site and surrounding areas. The nearest KCSO substation that would serve the project site is the North Area Substation located at 181 East First Street, which is approximately 5 miles north of the project site. Similar to fire protection services, the need for police protection services would potentially increase during construction of the proposed project.

The project site is located in a relatively remote location surrounded by undeveloped land and agricultural uses. Due to the nature of the project, it is considered unlikely to attract vandals or present other security risks that would make project facilities susceptible to crime and a substantial increase for law enforcement services is not expected.

Construction and decommissioning activities may slightly increase traffic volumes along SR 33 during the 24-month construction period. The added traffic associated with workers commuting to the project site, haul routes, deliveries, and other project-related traffic would be temporary; therefore, would not have a significant adverse effect on the law enforcement protective service provision or CHP's ability to patrol the highways or be needed to maintain service. Furthermore, the project would be required to implement a construction traffic control plan as detailed in MM 4.17-1 (see Section 4.17, *Traffic and Transportation*). Since no new or physically altered law enforcement facilities would be required to accommodate the proposed project, construction-related impacts would be less than significant.

Operation

As described above, the project site is located in a relatively remote rural area, and although located near SR 33, is sparsely populated. The surrounding areas are dominated by oil and gas exploration and production and agricultural lands and is thus unlikely to attract vandals or present other security risks that would make project facilities susceptible to crime. The entrance to the project site is gated, with security, and located at the western intersection of Skyline Drive and Elk Hills Road. The main entrance is only available for construction, operational, and emergency vehicle access. The project components would be fenced as needed for safety and security.

Additionally, the project would include full time security operations on site. Security would be maintained by CRC Elk Hills Security personnel. If the project site is easily accessible from outside the boundaries of the CRC Elk Hills Petroleum Reserve, then a six-foot tall wire fence shall be erected, and the site attended by a security guard during non-working hours at the discretion of the project management.

The KCSO would respond from patrols originating from the existing substations, and officers/deputies that already patrol the site and surrounding areas. Therefore, no new or physically altered law enforcement facilities would be required to serve the proposed project.

The additional volume of vehicles associated with workers commuting to the project site during operations and routine maintenance would be minor and is not expected to adversely affect traffic (see Section 4.17, *Transportation and Traffic*). Therefore, impacts to the CHP patrol are not anticipated. The project would not result in the 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 law enforcement services.

No new or physically altered law enforcement facilities would be required to accommodate the proposed project. However, the project could increase demand for law enforcement protection services in the future; thereby necessitating additional staff or construction of new facilities; therefore, impacts would be potentially significant and MM 4.15-1 through MM 4.15-5 would be required.

Schools, Parks, and Other Public Facilities

Construction and Decommissioning Impacts

As described above, the project would require a maximum of approximately 80 workers during the peak construction period. The presence of construction workers at the project site would be temporary, over the duration of the approximate 24-month construction period. These workers would likely come from an existing local and/or regional construction labor force and would not likely relocate their households as a consequence of working on the project. If temporary housing should be necessary, it is expected that accommodations would be available in the nearby hotels. Therefore, the short-term increased employment of construction workers on the project site would not result in a notable increase in the residential population of the area surrounding the project site.

Accordingly, there would not be a corresponding demand or use of the local schools, parks, or public facilities. Therefore, project construction workers would not increase demand for local schools, parks, or public facilities such that substantial physical deterioration of such facilities would occur, nor would project construction require the construction or expansion of recreational facilities which might have an adverse effect on the environment, nor result in substantial adverse physical impacts associated with the construction of new or physically altered facilities in order to maintain acceptable service ratios. Therefore, impacts during construction would be less than significant.

Operation

Upon completion of all construction activities, the project proponent would ensure that the facility would be properly operated and maintained. The project proponent would develop an operations and maintenance protocol to be implemented throughout the life of the project. Once completed, the project will include five full-time employees which will operate the facility seven days a week, 24 hours a day. An additional five full-time employees could be on site at any time if repairs or other maintenance work is required.

These employees would likely come from an existing local and/or regional labor force and would not likely relocate their households as a consequence of working on the project. Even if the maintenance employees were hired from out of the area and had to relocate to northwestern Kern County, the resulting addition of potential families to this area would not result in a substantial increase in the number of users at local schools. Therefore, staff required during operation would not increase demand for local schools, parks, or public facilities such that substantial physical deterioration of such facilities would occur, nor would project construction require the construction or expansion of recreational facilities which might have an adverse effect on the environment. Substantial adverse physical impacts associated with the construction of new or physically altered facilities in order to maintain acceptable service ratios would not occur with project implementation.

No new or physically altered park, school or community facilities would be required to accommodate the proposed project as the construction jobs would be drawn from local areas and employment is limited to five jobs.

The potential fiscal impacts on county services require mitigation to ensure one time sales tax is collected for the benefit of the unincorporated area of Kern County, jobs are drawn from local areas, and fire services provide the training and equipment needed at no additional cost to the County. The unique nature of the project, which will require monitoring for 50 years after injection ends, requires mitigation beyond any bonding required by the EPA. That bonding is specifically for the EPA requirements and would not be available to cover county services, consultation or response. MM 4.15-3 and MM 4.15-5 will provide a Cumulative Impact Oil and Gas Reservoir Pore Space Charge (CIC-ORPS) to cover public services and provide an annual payment for the 50-year monitoring period after injection ends. MM 4.15-1 through MM 4.15-5 provides further finance assurances and implements county policy.

Mitigation Measures

MM 4.15-1 The project proponent/operator shall work with the County to determine how the use of sales and use taxes from construction of the project can be maximized. This process shall include, but is not necessarily limited to, the project proponent/operator obtaining a street address within the unincorporated portion of Kern County for acquisition, purchasing and billing purposes, and registering this address with the State Board of Equalization. As an alternative to the aforementioned process, the project proponent/operator may make arrangements with Kern County for a guaranteed single payment that is

equivalent to the number of sales and use taxes that would have otherwise been received (less any sales and use taxes actually paid); with the amount of the single payment to be determined via a formula approved by Kern County. The project proponent/operator shall allow the County to use this sales tax information publicly for reporting purposes.

MM 4.15-2 Prior to the issuance of any building permits on the project, the project operator shall submit a letter detailing the hiring efforts prior to commencement of construction, which encourages all contractors of the project site to hire at least 50 percent of their workers from local Kern County communities. The project operator shall provide the contractors a list of training programs that provide skilled workers and shall require the contractor to advertise locally for available jobs, notifying the training programs of job availability, all in conjunction with normal hiring practices of the contractor.

MM 4.15.-3 The following Cumulative Impact Oil and Gas Reservoir Pore Space Charge (CIC-ORPS) shall be implemented as an annual payment due every year for the life of the project or as a lump sum payment for multiple years until the project is decommissioned under MM 4.15-5 or the Conditional Use Permit is modified.

1. Prior to grading or construction, a CIC-ORPS site plan shall be submitted by the applicant. The map shall calculate the CIC-ORPS net acreage as follows:
    A. Total gross acreage of the approved Conditional Use Permit CCS Surface Land area.
    B. Total acres for the "net "calculation may exclude existing unpaved oilfield roads, public access easements, conservation easements and pipelines utilizing a 50 feet total width easement. All such exclusions are to be mapped and shown as to location on the CIC-ORPS site plan.
    C. Calculation for payment of the CIC-ORPS.
2. A payment of from $0 up to $400 per net acre shall be paid annually for all acres in the approved Conditional Use Permit regardless of phased implementation of facilities or the project injection schedule.

    The payment schedule shall be as follows:
    1. First 12 months of operation after first injection made, regardless of amount injected or months without injection activity. – no payment
    2. Year 2 – Year 6 - $200 per net acre
    3. Year 7 – Year 10 - $300 per net acre
    4. Year 11 – end of injection - $ 400 per net acre

    A. The first payment is due on the 13th month after the first date of injection of any CO_2, including any test injection. Annual

payments are due every year after based on the date of the first-year payment.

B Payments shall be made to the Planning and Natural Resources Department for transfer directly to the County Administrative Office (CAO) Fiscal Division and labeled Cumulative Impact Oil and Gas Reservoir Pore Space Charge (CIC-ORPS) with the project name, location, and APNs.

C. An advance payment option for a lump sum of future payment years, 5 or more years at once , or a reduction in each year's payment for 5 or more years with a lump sum payment at the end of the reduction period, may be requested by submittal of a written request to the Kern County Planning and Natural Resources Department with details of the offer no later than 90 days before the yearly payment is due. The offer shall be reviewed and approved by the County Administrative Office (CAO).

3. A 10% reduction in the per net acre annual payment shall be granted by the CAO for

   To qualified injection sources, after submittal of a request, if they meet all of the following criteria.

   a. A Qualified Injection Source is a new legally permitted operating facility, that pays local property taxes, located in unincorporated Kern County on land owned by California Resources Corporation (CRC) that sends CO_2 to Carbon TerraVault 1 (Kern County) for injection.

   b. All components of a facility, including onsite accessory electricity production or energy storage count as one facility. Only one 10% reduction will be applied on each facility that qualifies even if phased.

   c. The facility must be operating at the time of the first payment that is made that includes the reduction. The reduction will be reviewed annually by the CAO for applicability.

   c. Projects on land not owned by CRC or in incorporated cities or other counties or pipelines on CRC land do not qualify.

   d. The final determination on meeting the criteria and implementation of the reduction shall be made by the CAO after review of the applicant submittal. Requests for a reduction may be made no earlier than 90 days before the next scheduled payment by written letter to the Kern County Planning and

Natural Resources Department who shall verify the location and facility permitting before transmitting to the CAO.

4. If at any time, the Kern County Tax Assessor verifies that the Franchise Tax Board has determined that pore space utilized for storage of CO 2 may be assessed for local property tax and a method for valuation has been established, then the County Administrative Office may request the CIC-ORPS amount be adjusted. Reduction for pore space property tax assessment or deletion of the entire CIC-ORPS may only be made by the Kern County Board of Supervisors at a noticed public hearing for the amendment of MM 4.15-3 with appropriate findings of facts.

MM 4.15-4 An annual payment of $ 250,000 shall be made to the Kern County Planning and Natural Resources Department for transfer to the Kern County Fire Department for equipment and training specific to the detection and control of emergency situations caused by CO_2. The first payment is due 60 days after the issuance by the EPA Class VI UIC permit for construction of any well. Annual payments are due every year on the date of the first year payment.

MM 4.15-5 The owner/operator shall provide written notification that the facility is being prepared for closure and the permanent end of injection activities. The following are Kern County requirements for closure and long-term management of the Carbon Capture and Storage area.

A. Within 30 days of the final and last injection of CO_2 and evidence notice has been given to the EPA UIC Director of the end of all injection activities, the first payment of $ 100,000 (Completion Funding) shall be made, and on that annual date thereafter, to the Kern County Planning and Natural Resources Department for transfer to the County Administrative Office (CAO). The funding shall be used as determined by the Kern County Board of Supervisors for any budget item as long as consultation with all State and Federal agencies for the 50 years of required monitoring is accomplished. No bond or other instrument of credit may substitute for the required cash Completion Funding payment. Any emergency incident response and related coordination by County departments shall be billed to the owner/operator for full reimbursement at no net cost to Kern County. The Completion Funding shall **not** be reduced or offset by any potential contributions from the State or Federal government to Kern County for monitoring and maintenance responsibilities.

B. Upon receipt of the one-time Completion Funding, the Kern County Planning and Natural Resources Department shall prepare a modification of the Conditional Use Permit for consideration at a noticed public hearing of the Kern County Board of Supervisors. The modification of the Conditional Use Permit shall include, but not be limited to, the necessary findings and actions to modify Conditional Use Permit conditions to

address the CCS project is now in long term closure and monitoring, and ending of the annual payments for the Cumulative Impact Oil and Gas Reservoir Pore Space Charge (CIC-ORPS) (MM 4.15-3) and the Fire Department CO_2 mitigation (MM 4.15-4).

Level of Significance after Mitigation

Impacts would be less than significant.

4.15.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report – Revisions to the Kern County Zoning Ordinance – 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The aforementioned documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate Bill [SB] 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to public resources is considered the County. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on public services. This geographic scope of analysis is appropriate because law enforcement, fire protection and other facilities and services are provided by the County on a County-wide basis.

Impact 4.5-4: Contribute to Cumulative Public Services Impacts

The cumulative impact analysis area for public services includes the service areas for each of the fire, police and other governmental offices/facilities serving the project site. Cumulative impacts for services are now viewed by Kern County as the fiscal impacts of the use of the land and the impacts on surrounding communities if land is utilized for industries that do not produce taxes due to a special exclusion, such as the Solar Tax Exclusion for large scale solar and lack of taxation methods for permanent CO_2 underground storage.

Public Services are funded through property tax on the land and, after construction, increased assessments on any buildings or equipment. Such building/equipment assessments decline over the life of the project based on an amortization determination as the equipment declines in value through use. While the Class VI injection wells and monitoring wells do represent equipment that normally can be assessed, oil and gas assessments are based on a company's regional holdings including the oil that could be extracted. For example, when an oil well is plugged and abandoned not only is the equipment no longer is included in assessed valuation but the actual reserves of available oil declines as well. To evaluate the potential loss of tax revenue from the State of California policies, the Board of Supervisors commissioned a report for the Oil and Gas tax revenues for the 2018-2019 tax rolls (Kern County Oil and Gas Property Tax Revenue Report July 8, 2020) (Kern County Planning and Natural Resources Department 2020). While the contribution for fiscal year 2018–2019 was over $80 million for the County General fund, that could be used for services, the amount has declined significantly over the prior 10 years and has declined an another 40 percent since the 2018–2019 tax rolls. These declines are not from a lack of extractable oil but through the State of California delays in oil and gas permitting and policies to initiate the end of the use of Hydraulic Fracturing on wells statewide by 2024 and directing the California Air Resources Board to create regulations to phase out all oil production by 2045. This would impact over 2.4 million acres of land currently used for various facilities for oil and gas production that produce property tax revenue for used for provision of public services countywide.

Similar to the property tax exclusion for commercial scale solar CCS facilities have a unique property tax assessment profile. While the surface use as vacant land or agriculture would be assessed normally, the CCS Surface Land Area would not produce any more taxes related to the storage underground of the CO_2. Such capture and storage cannot be further assessed as the $CO_2$is permanently stored and cannot be taken out again and used. At this time, no valuation method or other taxation process has been established that would allow the Kern County Tax Assessor to collect local property taxes on the CCS Surface Land Area. Therefore, it cannot be classified as a taxable commodity. The storage operation, however, takes up surface land that could have been used for industrial or other use that would produce additional taxes for storage. Further the use of the land, with geological reservoirs unique to oil and gas fields, for CO_2storage precludes the use

of the land for oil and gas extraction under the regulations of SB905 that does not allow the use of CO_2 associated with CCS for enhanced oil recovery and the EPA Underground Injection Control regulations that limits potential penetrations of the capstone layer or storage area to avoid leakage. Therefore, the CCS Surface Land Area is essentially placed off limits for tax generating uses while also contributing to the decline of oil revenue for the General Fund. This is a direct impact from the projects use of the land and the lack of new revenue links to the decline of county funding which prevents the physical decline of communities, homes, and businesses. Such decline and quality of life issues for communities is directly tied to the lack of such services as code enforcement, law enforcement, fire protection, maintenance of roads, as well as health and safety issues such as elderly care and child protection services. The cumulative impacts of the Kern County known and submitted applications for proposed CCS facilities represent 37,277 acres of surface that will could be limited in tax generating uses if all are approved. While additional facility sources, which will need to be processed through project specific CUPs and EIRS, will be proposed to generate CO_2 for injection into this CCS facility, those projects increased tax revenue is specific to that project and can not be used to justify the CCS facility impacts.

The cumulative impacts of the continued loss of oil and gas revenues due to State policies combined with these new CCS projects deepens the ongoing fiscal emergency for the county. In addition, other State policies are contributing to this fiscal crisis of land use, including the Solar Tax Exclusion which has resulted in over $103 million of lost revenue just over the last 10 years, and the lack of subvention for the Williamson Act Land Use Contracts and Farmland Security Zone contracts which provide tax reductions for qualified Agricultural use which now is over $60 million since 2009. The KCGP policies require development to address economic deficiencies in public services and facilities costs. While the project will pay Oil and Gas Tax assessment, those revenues will continue to decline based on State policies and the land will be restricted to this CCS approval with no opportunities for use of surface to generate addition revenues. This lack of revenues will contribute to the fiscal emergency that will impact surrounding communities in the unincorporated areas of the Valley and countywide.

To address this fiscal deficiency in public services revenue, MM 4.15-1 and MM 4.15-3 are being required to provide for a CIC-ORPS and maximizing sales and use tax for the county from the project. A method of maximizing use and sales tax for the project for revenues to Kern County is required under MM 4.15-1. The CIC-ORPS has been calculated based on the value of the property if utilized for oil and gas production. The amount the project will pay, in addition to property taxes, on an annual basis is calculated as $400 per net acre. The project will not pay on acres that are shown on an approved site plan as pipelines with a maximum of 50 feet wide easement, unpaved oilfield roads, recorded public access easements, and conservation easements. All land within the CUP boundary will pay the CIC-ORPS annually until the project is moves into long term monitoring and final decommissioning and MM 4.15-5 is implemented. The CIC-ORPS is estimated to provide an estimated $3.9 million a year in addition to the Oil and Gas Valuation assessed taxes for public services. Final determination of the amount will be based on a site plan for the CCS Surface Land Area that shows the exclusions for pipelines, unpaved oilfield roads and other easements.

To ensure the Fire Department has the specialized training and equipment required to respond to a CO_2 release or other emergency event at the project, MM 4.15-5 require annual payments of $250,000 to be made to the county, commencing 60 days after the issuance of the EPA Class VI UIC permit for any well. The funding may be used by the Fire Department to support other first responders' needs to manage CO_2 releases or emergencies.

Once the project has reached capacity or has determined to cease operations and close under the EPA UIC permit protocol, MM 4.15-5 requires that in place of MM 4.15-3 (CIC-ORPS) and MM 4.15-4 (Fire Department CO_2 mitigation) funding, and annual payment of $100,000 be made and any response for incidents will be reimbursed for costs (MM 4.15-5). The funding would be used at the discretion of the Kern County Board of Supervisors for department responses to emergencies at the facility and any coordination with state and/or federal agencies responsible for long-term monitoring and maintenance of the storage area, which is currently estimated to be a 50-year time period after all injection activities cease before final closure occurs. During the monitoring period, the applicant will still have bonding in place with state and federal agencies and be accountable to the EPA and state. As the project area will no longer be paying the CIC-ORPS and oil and gas revenues, based on state policies, will have declined or even ceased, the funding can be used for any public services required county wide through the normal budget process.

Mitigation Measures

Implement MM 4.15-1 through MM 4.15-5, as described above.

Level of Significance after Mitigation

Cumulative impacts would be less than significant.

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Section 4.16

Recreation

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Section 4.16

Recreation

4.16.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for parks and recreation facilities. It also describes the impacts on parks and recreation facilities that could result from implementation of the Carbon TerraVault 1 (Kern County) Project (project). The project site is a specific set of parcels within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself (see Chapter 3, *Project Description*). Elk Hills is located approximately 26 miles from the City of Bakersfield, approximately 8.5 miles from the City of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

A description of the environmental setting (affected environment) for recreation is presented below in Section 4.16.2, *Environmental Setting*, including discussion of the regional and local recreational facilities. The regulatory setting applicable to recreation is presented in Section 4.16.3, *Regulatory Setting*, and Section 4.16.4, *Impacts and Mitigation Measures*, discusses project impacts and associated mitigation measures.

4.16.2 Environmental Setting

Regional Setting

Kern County is geographically California's third largest county, encompassing 8,202 square miles at the southern end of the Central Valley. The proposed project site is located within the Elk Hills, which comprises an approximately 75-square-mile (47,800-acre) complex in the San Joaquin Valley of unincorporated Kern. The project area is bounded by Kings and Tulare Counties to the north, Santa Barbara and San Luis Obispo Counties to the west, the Tehachapi Mountains and the Sierra Nevada Mountains to east, and the northern boundary of the Los Padres National Forest to the south.

Kern County provides many recreational opportunities, including camping, hiking, horseback riding, boating and water skiing, bird watching, picnicking, scenic viewing, golf, baseball and softball, and soccer facilities.

The Kern County Parks and Recreation Department manages an extensive system of regional parks designed to serve the County-wide population and small neighborhood and community parks primarily intended to meet the recreational needs of nearby residents in unincorporated communities. Including incorporated areas, Kern County contains 4,726 acres of park land with 4,282 acres of regional parks and 389 acres of local neighborhood parks, both leased and owned by the County (Kern County Parks and Recreation Department 2010).

Local Setting

The project site is located in West Kern County, which is served by one regional park, seven local/ neighborhood parks, one golf course, and two public buildings (Buttonwillow Recreation Building and Veterans Memorial Building). The project site is located within the Elk Hills oilfield, which comprises an approximately 75 square-mile (47,800-acre) area used for oil and gas exploration and production. There are no recreational facilities or parks within or adjacent to the project site. The closest recreational facility is the Buttonwillow Recreation and Park District, located approximately 5.5 miles northeast of the proposed project (Figure 4.16-1).

State

The California State Parks Service owns, maintains, and operates one State Park (Red Rock Canyon), two State historic parks (Fort Tejon and Tomo-Kahni), and one State reserve (Tule Elk) in Kern County. The closest of these is the Tule Elk State Reserve, which is approximately six miles from the proposed project.

National Parks and Trails

Several national and state parks are located in California's Central Valley and southern desert region, which are within and/or accessible from Kern County. The Sequoia National Park is located in Kern County and is approximately 95 miles northeast of Elk Hills. Other parks accessible from Kern County include Death Valley National Park and Kings Canyon National Park, and Mojave National Preserve, which are all at least 100 miles from Elk Hills. The Pacific Crest Trail also traverses Kern County along a route that lies east of Tehachapi and Lake Isabella and is approximately 65 miles from Elk Hills.

4.16.3 Regulatory Setting

Federal

As the project is not located wholly or partially within any federal recreational facilities, there are no federal recreation regulations applicable to this proposed project.

State

As the project is not located wholly or partially within any federal recreational facilities, there are no state recreation regulations applicable to this proposed project.

Figure 4.16-1: Parks and Recreational Facilities in the Region

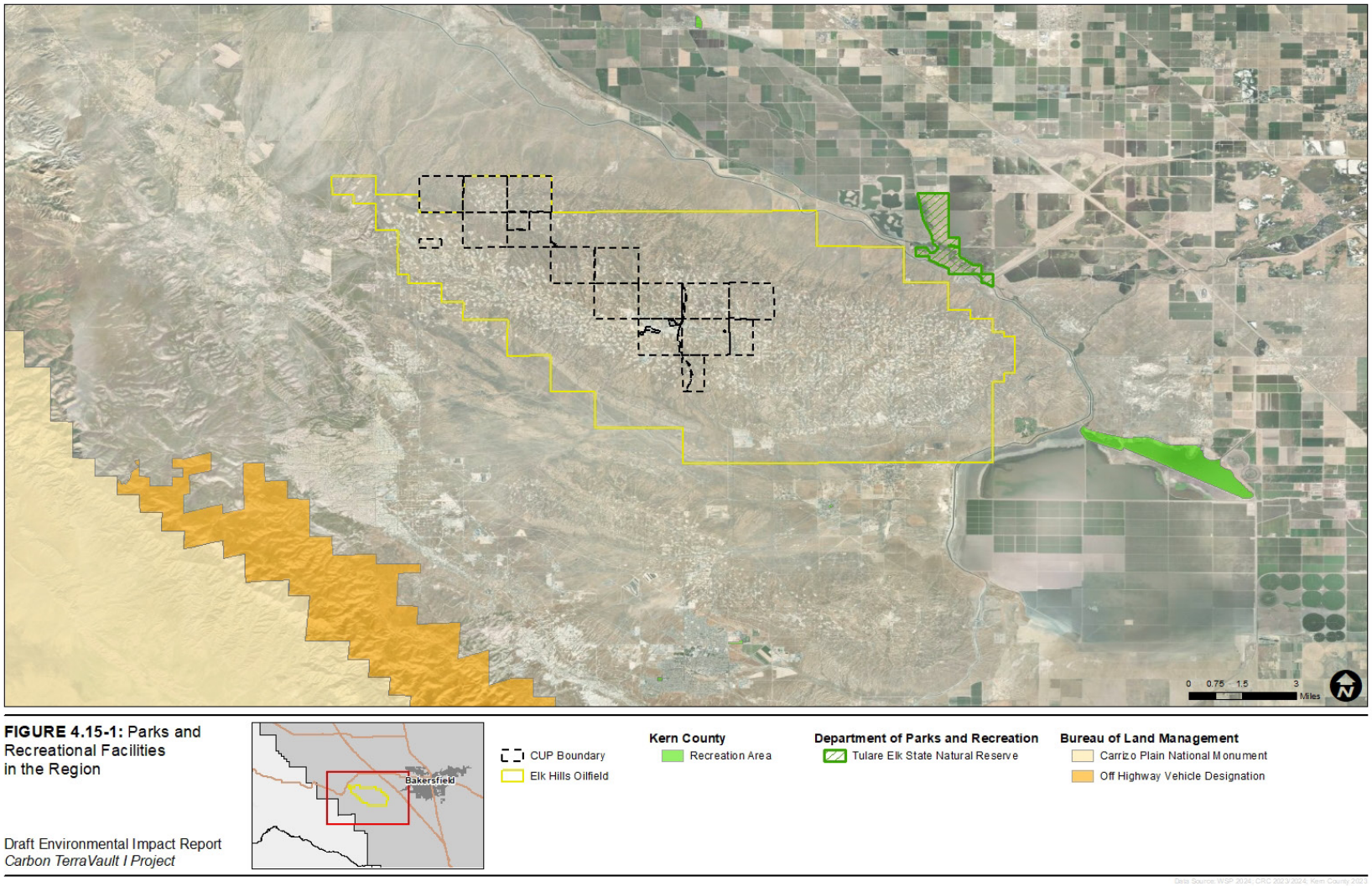

FIGURE 4.15-1: Parks and Recreational Facilities in the Region

Draft Environmental Impact Report
Carbon TerraVault I Project

Local

Kern County Specific Plans

Kern County has adopted 24 Specific Plans for different geographic areas of the County. These Specific Plans are intended to be an amplification of the goals and policies of the KCGP and are, therefore, consistent therewith. The project site is not located wholly or partially within any adopted Specific Plan areas.

Kern County Parks and Recreation Master Plan

The Kern County Parks and Recreation Master Plan (Master Plan) was published in 2010 with the primary purpose of helping guide decision-makers in the development of the Kern County park system through 2028 (Kern County Parks and Recreation Department). The recommendations, goals and strategies presented in the Master Plan were developed based on an assessment of all existing County parks and public input to identify community priorities. The project site is located within Area 4 – West Kern County and the Buttonwillow Recreation and Park District (see Figure on page II-6 in the May 2010 Kern County Parks and Recreation Master Plan). This western part of Kern County, which lies on the border of San Luis Obispo County, is a major oil production region, and includes the valley communities of Buttonwillow, Maricopa, and Taft among others. As previously noted, the area is served by one regional park, seven local/neighborhood parks, one golf course, and two public buildings (Buttonwillow Recreation Building and Veterans Memorial Building). Altogether, Area 4 encompasses 1,655 acres of County park land.

4.16.4 Impacts and Mitigation Measures

Methodology

Recreational facilities and opportunities in the area were evaluated to determine whether they would be adversely affected by the project. This evaluation included consideration of the overall number and area of parklands or other recreational facilities and proximity to the project, and whether the project would result in overuse and deterioration of existing facilities or necessitate the construction of new facilities.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist identify the following criteria, as established in Appendix G of the CEQA Guidelines, to determine if a project could potentially have a significant adverse effect on recreation. A project could have a significant adverse effect on recreation if it would:

- 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; or

- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Project Impacts

Impact 4.16-1: Increase the Use of Existing Neighborhood and Regional Parks or Other Recreational Facilities Such That Substantial Physical Deterioration Would Occur or Be Accelerated

As described in Chapter 3, *Project Description*, construction of the project would require approximately 80 workers daily during the peak construction period. The presence of construction workers at the project site would be temporary, over the duration of the approximate two-year construction period. Construction workers would likely come from an existing local and/or regional construction labor force and would not likely relocate their households as a consequence of working on the project. Construction workers are expected to travel to the site from various locations throughout the County and Southern California. If temporary housing should be necessary, it is expected that accommodations would be available in nearby communities, such as Lost Hills, Buttonwillow, and Blackwells Corner. Any construction workers who relocate to these areas may use the neighborhood and regional parks in the vicinity of the project site. Due to the limited addition of people to the area, and the short-term duration of construction, the potential temporary increase in use by project personnel at any one park or recreational facility is not anticipated to be significant or result in a detectable physical deterioration of parks and other facilities.

Once construction is completed, the project will include five full-time employees which will operate the facility seven days a week, 24 hours a day. An additional five full-time employees could be on-site at any time if repairs or other maintenance work is required. It is expected that some of these individuals would already reside in the area and operation of the project would not result in a substantial influx of people (such as a new residential development, school, or other use that would result in large volumes of people residing or traveling to the project site). The KCGP requires 2.5 acres of parkland for every 1,000 residents. The ratio of parkland to residents is five acres per 1,000 residents. Therefore, an increase of approximately of up to 10 employees as a result of the project would not cause this ratio to be exceeded.

As indicated above, the project site is within Elk Hills, which is surrounded by agricultural lands and not located near any existing parks or recreational facilities and itself does not wholly or partially contain any parks or recreational facilities. Therefore, impacts to the use of existing parks or recreational facilities are expected to be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.16-2: Include Recreational Facilities or Require Construction or Expansion of Recreational Facilities That Might Have an Adverse Physical Effect on the Environment

As discussed above, implementation of the project would not result in substantially increased use of any area recreational facilities and would not require construction of new or expansion of any other existing recreational facilities due to the very low population growth projected to occur in the project area from construction and operation of the project. Therefore, impacts to the environment as a result of changes to recreational facilities are expected to be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

4.16.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The aforementioned documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate Bill [SB] 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting

years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. The California Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to recreational resources is considered the County. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Chapter 3, Section 3.9, *Cumulative Projects*, would have on recreational resources. This geographic scope of analysis is appropriate because the recreational resources within this area are expected to be similar to those in the project site because of their proximity.

Impact 4.16-3: Cumulative Impact on Recreational Facilities

With regard to impacts to recreational facilities, the project does not have the potential to contribute significantly to cumulative impacts within the County. With regard to cumulative effects of the project, together with other projects resulting in increased use of parks (Impact 4.16-1), the project's impact would be minimal because any nominal increase in the oil and gas and carbon capture and storage workforce in the future would likely be comprised of local Kern County residents. The project's contribution to any cumulative recreation impact would not be cumulatively considerable. With regard to Impact 4.16-2, the project's impacts was determined to also be minimal for similar reasons and, therefore, would not contribute to cumulative impacts together with other projects.

The project is not expected to result in a significant increase to the population of the surrounding communities. Construction workers would result in only a temporary increase in population, and the full-time employees proposed as part of the project would only result in a minimal increase to the population of the area. Overall, the project would not bring in a substantial amount of people to warrant considerable increased use of recreational facilities in the area. A complete analysis of the cumulative impacts to recreational facilities from oil and gas operations are provided in Chapter 4.15, *Recreation*, of the Kern County Oil and Gas EIR.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Cumulative impacts would be less than significant.

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Section 4.17

Transportation and Traffic

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Section 4.17

Transportation

4.17.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for transportation and traffic. It also describes the impacts on transportation that would result from implementation of California Resources Corporation's (project proponent) proposed Carbon TerraVault 1 (Kern County) Project (project). The project site is a specific set of parcels (See Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft and approximately 4 miles from the unincorporated community of Buttonwillow.

A description of the environmental setting (affected environment) for transportation and traffic is presented below in Section 4.17.2, *Environmental Setting*, including discussion of the regional and local facilities, existing conditions, other transportation facilities, and military aviation facilities in the vicinity. The regulatory setting applicable to Transportation is presented in Section 4.17.3, *Regulatory Setting*. Section 4.17.4, *Impacts and Mitigation Measures*, discusses project impacts and associated mitigation measures.

Information contained within this section was primarily provided by the Traffic Impact Study, dated October 2023, which was prepared by Ruettgers & Schuler Civil Engineers and included as Appendix I of this EIR. The Traffic Impact Study provides an analysis of existing and proposed traffic conditions. Potential traffic impacts to intersections and roadways were determined for both development/construction and operation of the project using the most recently published roadway traffic volumes and project-related vehicle trip calculations. Discussion and evaluation of transportation facilities, including pavement conditions, are based on site surveys with applicable thresholds and impacts identified. Additional impacts to the airport system are also discussed.

4.17.2 Environmental Setting

Kern County (County) is California's third largest county, encompassing 8,202 square miles at the southern end of the Central Valley. The portion of the San Joaquin Valley Air Pollution Control District within Kern County serves as the regional setting for purposes of this chapter. The San Joaquin Valley Air Pollution Control District includes the entirety of San Joaquin, Stanislaus, Merced, Madera, Fresno, Tulare, and Kings Counties and part of Kern County. The project site is located in the Central Valley portion of Kern County, an area that contains a variety of accessways, including regional and local roads and public transit facilities.

This section discusses the existing conditions related to transportation and traffic in the region and in the vicinity of the project site. The circulation system in the vicinity of the project site is made

up of a combination of state, county, and private jurisdiction facilities. Major components of the system are discussed below.

Regional and Local Roadway Facilities

Regional access to the project site could be obtained via the numerous highways and two-lane roads that traverse Elk Hills, as shown in Chapter 3, *Project Description*, Figure 3-1.

Regional Roads

Interstate 5 (I-5) is a major, four-lane, divided freeway that extends north from the Mexican border to the Canadian border and provides access for goods movement, shipping, and travel. This highway crosses the western portion of Kern County and is designated as an arterial/major highway by the Circulation Element of the Kern County General Plan (KCGP).

State Route (SR) 33 (Westside Highway) connects U.S. Route 101 at Ventura with I-5 near Vernalis and Tracy. The highway begins in Ventura as a freeway, but changes to a rural character as it ascends the San Rafael Mountains near Ojai. SR 33 descends into the San Joaquin Valley and becomes a parallel route to I-5, serving the communities of Maricopa, Taft, Avenal, Coalinga, Mendota, Los Banos, and Patterson. SR 33 ends at the junction with I-5 just southeast of Tracy.

SR 58 (Rosedale Highway/Mojave Freeway) begins in San Luis Obispo County, enters Kern County near McKittrick, and runs east through Bakersfield and Mojave to the County boundary past Boron to end in San Bernardino County. This route is a divided highway that runs generally east-west across Kern County, connecting Bakersfield, Tehachapi, and Mojave to Lenwood and Barstow to the east. The right-of-way varies between two and four lanes.

SR 119 (Taft Highway) runs in an east-west direction from SR 33 in Taft to SR 99 in Bakersfield. SR 119 is part of the former U.S. Route 399, which ran along SR 33 and SR 166 before ending at SR 99 (known as U.S. 99 before 1964). It serves as the main connector between the extreme southwestern corner of the San Joaquin Valley and Bakersfield.

Local Roads

County roads that are expected to provide access to Elk Hills and ancillary facilities in the project site, and also serve as links for regional traffic, include Skyline Road and Elk Hills Road. These roadways all operate with two lanes within the vicinity of the project site. Primary access to the project site would be via existing access at the western intersection of Skyline Drive and Elk Hills Road. The access road connects to a network of existing dirt roads within the field.

Skyline Road is closed to public entry and is the southern boundary of the project. Skyline Road connects to Elk Hills Road. California Resources Corporation's gated and guarded entrance to the field is located at the western intersection of Skyline Drive and Elk Hills Road.

Elk Hills Road connects Elk Hills Road to the town of Taft, to the south, with Buttonwillow to the north. California Resources Corporation's gated and guarded entrance to the field is located at the western intersection of Skyline Drive and Elk Hills Road.

Other county roads expected to provide east-west access to the oilfields include Garces Highway, Pond Road, Sherwood Avenue, Whisler Road, Kimberlina Road, Merced Avenue, and Stockdale Highway (Chapter 3, *Project Description,* Figure 3-1). These roads all operate as two-lane roadways in the vicinity of the oilfields.

Other Transportation Facilities

Public Transit Service

Kern County operates Kern Regional Transit, which operates daily bus routes within the unincorporated communities of Buttonwillow, Lamont, Kern River Valley, Frazier Park, Rosamond, and Mojave. In western Kern County, bus routes connect Bakersfield to various cities including Delano, Wasco, Taft, Lebec, and Frazier Park (KRT 2023). Kern Regional Transit also provides intercity service between Delano/McFarland/Wasco/Shafter/ Bakersfield, Lamont/Bakersfield, Lake Isabella/Bakersfield, Frazier Park/Bakersfield, California City/Mojave/Rosamond/ Lancaster/Palmdale, Lost Hills/Bakersfield, and Taft/Bakersfield. Golden Empire Transit District operates daily bus routes within the city of Bakersfield and surrounding unincorporated areas (GetBus 2022). Greyhound provides bus service from Bakersfield north to Fresno and from Bakersfield south to Los Angeles (Greyhound 2023). The project would not be not located along an existing bus route and local roadways that are likely to be used during construction and operation of the project do not have bus stops.

Railways

Amtrak provides passenger rail service from Bakersfield north to Sacramento with their San Joaquin Train service (Amtrak 2023). Rail service from Bakersfield to Los Angeles is provided via San Francisco. A direct connection to the south through Los Angeles is not currently provided, but high-speed rail service between San Francisco and Los Angeles via Bakersfield may be available by 2029 (Amtrak 2023; California High-Speed Rail Authority 2023). The high-speed rail would provide connections through this corridor via Fresno to Bakersfield, Bakersfield to Palmdale, and Palmdale to Los Angeles.

Freight service is provided by the San Joaquin Valley Railroad, which operates throughout the San Joaquin Valley and interchanges with the Union Pacific Railroad and the Burlington Northern Santa Fe Railroad in Bakersfield. Commodities transported by the San Joaquin Valley Railroad include petroleum and agricultural products.

Aircraft and Military Aviation

Public Airports

Commercial air travel in western Kern County is provided by Meadows Field Airport in northern Bakersfield. Direct flights are available to Los Angeles, San Francisco, Phoenix, Houston, and other U.S. cities. Bakersfield Municipal Airport is located in the south-central Bakersfield area. Other public airports include Delano Municipal Airport, Wasco-Kern County Airport, Shafter Airport-Minter Field in northern Kern County, and Taft-Kern County Airport in southwestern Kern County. Smaller public airports (averaging less than 100 aircraft operations per month) are also located in western Kern County, including Lost Hills-Kern County Airport, Elk Hills-Buttonwillow Airport, and Poso-Kern County Airport (AirNav n.d.).

Private Airports

A number of private airstrips are located throughout western Kern County, including Tejon Ag and Paradise Lakes airfields south of Bakersfield, Majors Airfield north of Bakersfield, Joe Gottlieb Field Airport west of Bakersfield, and Cashen Airport northwest of Wasco. There are no private airports within the vicinity of the project site (AirNav n.d.).

Military Aviation

Kern County has two military aviation installations: the China Lake Naval Air Weapons Station and Edwards Air Force Base, both of which are located in the eastern part of the County. Nearby, in Kings County, is the Lemoore Naval Air Station, located in the central San Joaquin Valley. Each installation has unique flying operations and their primary mission is to test military aircraft and weapon systems. Due to the military bases' required flying mission, aircraft fly beyond the boundaries of the installations at supersonic speeds and sometimes as low as 200 feet above the ground. In order to minimize flight hazards to non-military aircraft, the military aircraft from these installations fly within restricted airspace known as the Joint Service Restricted R-2508 Complex. This complex is considered an extension of the airspace for these military aviation installations and their flying missions. Mojave Air and Space Port and Inyo Kern Airport both provide civilian flight testing and drone testing capabilities. Mojave Air and Space Port is also the first Federal Aviation Administration (FAA) licensed civilian space flight testing facility in the United States. There are no military airports within the vicinity of the project site (AirNav n.d.).

Bicycle and Pedestrian Facilities

According to the 2018 Kern Region Active Transportation Plan, the Kern region's bikeway network is not consistent throughout the Plan area. The Plan area includes the following cities and unincorporated areas: Arvin, Metropolitan Bakersfield (including Oildale, Lamont, and Weedpatch), Bodfish, Buttonwillow, California City, Delano, Ford City, Frazier Park, Greater Taft Area (City of Taft, Ford City, South Taft, and Taft Heights), Lake Isabella, Maricopa, McFarland, Mojave, Ridgecrest, Rosamond, Shafter, Tehachapi, and Wasco. Some cities and communities have networks that provide opportunities for safe and comfortable travel both on street and off-street, while others lack formalized bicycle infrastructure. Additionally, significant gaps remain

in the system, and closing these gaps is critical to providing good connectivity for people bicycling both within each community and while traveling between neighboring communities.

Like the Kern region's existing bikeway network, the region's pedestrian conditions vary widely. Some communities have a comprehensive sidewalk network with crossings and signage, while infrastructure is limited in other locations.

There are no dedicated pedestrian or bicycle facilities in the immediate vicinity of the project site, or along the surrounding roadways. Due to the rural nature of the project site, pedestrian and bicycle traffic is limited.

4.17.3 Regulatory Setting

Federal Aviation Administration

The FAA regulates aviation at regional, public, private, and military airports. The FAA regulates objects affecting navigable airspace and structures taller than 200 feet, according to Federal Aviation Regulation 14 Code of Federal Regulations (CFR) Part 77. For structures of this size, both the U.S Department of Transportation and the California Department of Transportation (Caltrans) require the proponent to submit FAA Form 7460-1, Notice of Proposed Construction or Alteration.

As described in 14 CFR 77.9 (Construction or Alteration Requiring Notice), each sponsor who proposes any of the following construction or alteration scenarios shall notify the FAA in the form and manner as follows:

If requested by the FAA, or if you propose any of the following types of construction or alteration, you must file notice with the FAA:

(a) Any construction or alteration that is more than 200 feet above ground level at its site.

(b) Any construction or alteration that exceeds an imaginary surface extending outward and upward at any of the following slopes:

  (1) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway more than 3,200 feet in actual length, excluding heliports.

  (2) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway no more than 3,200 feet in actual length, excluding heliports.

  (3) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport described in paragraph (d) of this section.

(c) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the

highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a) or (b) of this section.

(d) Any construction or alteration on any of the following airports and heliports:

(1) A public use airport listed in the Airport/Facility Directory, Alaska Supplement, or Pacific Chart Supplement of the U.S. Government Flight Information Publications.

(2) A military airport under construction, or an airport under construction that will be available for public use.

(3) An airport operated by a Federal agency or the U.S. Department of Defense.

(4) An airport or heliport with at least one FAA-approved instrument approach procedure.

(e) A notice for construction or alteration is not needed for the following:

(1) Any object that will be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation.

(2) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device meeting FAA-approved siting criteria or an appropriate military service siting criteria on military airports, the location and height of which are fixed by its functional purpose.

(3) Any construction or alteration for which notice is required by any other FAA regulation.

(4) Any antenna structure of 20 feet or less in height, except one that would increase the height of another antenna structure.

Per 14 CFR 77.7, notification requirements include sending one executed form set of FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area within which the construction or alteration will be located. The notice required must be submitted at least 45 days before the earlier of the following dates: (1) the date the proposed construction or alteration is to begin; or (2), the date an application for a construction permit is to be filed.

Per the notification requirements above, the project does not meet any of the conditions requiring notification.

State

California Department of Transportation - Encroachment Permits and Transportation Permits (Oversized Permits)

Caltrans has discretionary authority with respect to highways under its jurisdiction and may, upon application and if good cause appears, issue a special permit to operate or move a vehicle or combination of vehicles or special mobile equipment of a size or weight of vehicle or load exceeding the maximum limitations specified in the California Vehicle Code. The Caltrans Transportation Permits Issuance Branch is responsible for the issuance of these special transportation permits for oversize/overweight vehicles on the State Highway System.

California Vehicle Code, Division 15, Chapters 1 through 5 (Size, Weight, and Load) includes regulation pertaining to licensing, size, width, and load of vehicles operated on highways.

Caltrans has the discretionary authority to issue special permits for the movement of vehicles/vehicle loads that exceed statutory limitations for size or weight on state roadways as specified in Division 15 of the California Vehicle Code. Completion of a Transportation Permit application is required for Caltrans to issue a special permit (Caltrans 2023).

The project has the potential to require permits for this purpose, as trucks carrying equipment and carbon dioxide (CO_2) may exceed statutory limitations for size or weight on state roadways. This would be determined during later stages of design.

Public Resources Code Section 3237, Emergency Access

The California Department of Conservation, Geologic Energy Management Division (CalGEM), State Oil and Gas Supervisor District Deputy may order the plugging and abandonment of a well that has been deserted. For purposes of this regulation, credible evidence of desertion includes, but is not limited to, an operator's failure to maintain the access road to a well site passable to oilfield and emergency vehicles (California Public Resources Code 3237).

The project would be located on an oilfield with privately maintained and operated access roads, and therefore, is subject to this regulation.

California Street and Highway Code Section 660, 670-695, and 1450 et seq.

This code 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, provides for the issuance of written permits, and requires permits for any load that exceeds Caltrans weight, length, or width standards for public roads.

The project will require use of County and State roadways.

Senate Bill 743

The California Environmental Quality Act (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 driver delay to reduction of vehicular greenhouse gas emissions through creation of multi-modal networks, and creation of a mix of land uses that can facilitate fewer and shorter vehicle trips. Vehicle miles traveled is a measure of the total number of miles driven for various purposes and is sometimes expressed as an average per trip or per person. According to technical guidance issued by the Office of Planning and Research, projects generating less than 110 or fewer daily vehicle trips may be presumed to have a less-than-significant impact involving vehicle miles traveled.

Local

Kern Council of Governments 2022 Regional Transportation Plan/Sustainable Communities Strategy

The Kern Council of Governments, as a regional transportation agency, prepares the Regional Transportation Plan (RTP) to examine long-range transportation issues, opportunities, and needs for Kern County. The 2022 RTP is a 24-year blueprint that establishes a set of regional transportation goals, policies, and actions intended to guide development of the planned multi-modal transportation systems in Kern County (Kern COG 2022). The 2022 RTP includes a policy element that is shaped by goals, policies, and performance indicators, a description of planning assumptions for regional growth and future needs for travel and goods movement, a Sustainable Communities Strategy that identifies planning strategies and illustrative development patterns that would reduce greenhouse gas emissions, and a plan of action for the region to pursue to meet identified transportation needs. The RTP was developed through a continuing, comprehensive, and cooperative planning process, and provides for effective coordination between local, regional, state, and federal agencies.

The RTP promotes a more efficient transportation system that calls for fully funding alternative transportation modes, while emphasizing transportation demand and transportation system management approaches for new highway capacity. The Constrained Program of Projects (included in the 2022 RTP, Chapter 5, Strategic Investments, Table 5-1), includes projects that move the region toward a financially constrained and balanced system. Constrained projects have undergone air quality conformity analyses to ensure that they contribute to the region's compliance with state and federal air quality rules. The project would assist the County with its greenhouse gas reduction goals.

Kern County General Plan

The project site is located within the KCGP area and therefore, would be subject to applicable policies and measures of the KCGP. The Circulation Element and the Safety Element of the KCGP

include goals, policies, and implementation measures related to transportation and traffic that apply to the project, as described below.

Chapter 2. Circulation Element

Objectives

Objective 1. To make certain that transportation facilities needed to support development are available. To ensure that these facilities occur in a timely manner so as to avoid traffic degradation.

Objective 5. Maintain a minimum Level of Service (LOS) D for all roads throughout the County.

2.3.3. Highway Plan

Goals

Goal 5. Maintain a minimum LOS D.

Implementation Measures

Implementation Measure B. Continuity and integrity of the arterial and collector system at the mountain/valley region and the mountain/desert region boundary must be reviewed and approved in conjunction with project adoption on an individual basis.

Implementation Measure C. Conformance to alignment minimum design standards, where roadways that deviate from section and mid-section lines intersect those lines, must be reviewed and approved in conjunction with project adoption on an individual basis.

2.3.4. Future Growth

Goals

Goal 1. To provide ample flexibility in this plan to allow for growth beyond the 20-year planning horizon.

Policies

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 LOS D. 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.

Policy 4. As a condition of private development approval, developers shall build roads needed to access the existing road network. Developers shall build these roads to County standards unless improvements along State routes are necessary. If so, roads shall then be built to Caltrans standards.

Developers shall locate these roads (width to be determined by the Circulation Plan) along centerlines shown on the circulation diagram map unless otherwise authorized by an approved Specific Plan Line. Developers may build local roads along lines other than those on the circulation diagram map. Developers would negotiate necessary easements to allow this.

Implementation Measures

Implementation Measure C. Project development shall comply with the requirements of the Kern County Zoning Ordinance, Land Division Ordinance, and Development Standards.

2.5. Other Modes

2.5.1 Trucks and Highways

Goals

Goal 1. Provide for Kern County's heavy truck transportation in the safest way possible.

Goal 2. Reduce potential overweight trucks.

2.5.4. Transportation of Hazardous Materials

Goals

Goal 1. Reduce risk to public health from transportation of hazardous materials.

Policy 1. The commercial transportation of hazardous material, identification and designation of appropriate shipping routes will be in conformance with the adopted Kern County and Incorporated Cities Hazardous Waste Management Plan.

Policy 2. Kern County and affected cities should reduce use of County-maintained roads and city-maintained streets for transportation of hazardous materials.

Chapter 4. Safety Element

Goals

Goal 5. Ensure the availability and effective response of emergency services following a catastrophic event.

Policy 4. The County shall encourage extra precautions be taken for the design of significant lifeline installations, such as highways, utilities, and petrochemical pipelines.

4.6 Wildland and Urban Fire

Policy 1. Require discretionary projects to assess impacts on emergency services and facilities.

Policy 6. All discretionary projects shall comply with the adopted Fire Code and the requirements of the Fire Department.

Engineering, Surveying, and Permit Services Department

The Engineering, Surveying, and Permit Services Department enforces Kern County's development standards for streets and other infrastructure. The standards are applicable to all developments within Kern County that are outside of incorporated cities. Division 9 of the County's development standards specifies requirements for traffic studies. Division 1, Section 105-4, of the standards requires that all construction to connect driveway approaches to County roads must first be authorized by an Encroachment Permit. The Engineering, Surveying, and Permit Services Department's Transportation and Encroachments Permits Division issues Transportation Permits for vehicles on County roadways that carry oversized loads, as specified in the California Vehicle Code.

The traffic study prepared for the project would be consistent with the requirements of Division 9. The project would create new internal access roads on site and would therefore require an Encroachment permit. The project would also utilize trucking for potential oversized loads transporting CO_2 and equipment and would be subject to Transportation Permits.

4.17.4 Impacts and Mitigation Measures

Methodology

The potential impacts of vehicular traffic associated with trip generation and vehicle miles traveled (VMT) was evaluated for construction of the facility pipeline, CO_2 injection wells, and CO_2 compression and pumping facility, as well as the operation and maintenance (O&M) of the project.

The traffic operations analysis included a level of service (LOS) and VMT analysis for trip generation for the project. The VMT analysis relied on the Governor's Office of Planning and Research's Senate Bill (SB) 743: Technical Advisory on Evaluating Transportation Impacts in CEQA, dated December 2018.

Based on thresholds established by the Caltrans Guide for the Preparation of Traffic Impact Studies, a project must generate 50 or more trips in the peak hour to warrant the analysis of a roadway facility. As is shown in the trip generation tables below, the various components of construction of the proposed project would generate 52 trips in the AM or PM peak hour. Operation of the proposed project would generate 20 daily trips, which consist of up to 10 trips during the AM or PM peak hour, including daily operation and periodic maintenance trips.

There may be periodic overlap of the construction phases, but only for a limited time, and construction activities would have minimal impacts to surrounding accessways as the activities are limited to within the existing Elk Hills facility boundaries. Therefore, due to the amount of peak hour trips being generally less than 50 trips in the peak hour, and no more than approximately 52 trips, further LOS analysis is not warranted, and the construction and O&M phases of the project are not expected to cause any operational LOS impacts to the adjacent roadway facilities.

Construction Impacts

Pipeline Construction Phase

Traffic generated during the pipeline construction phase would include personnel vehicles and water trucks. These vehicles would access the pipeline along the route under construction at the time. Trip generation estimates for pipeline construction traffic is presented in Table 4.17-1. Construction operations are anticipated to occur between 6:00 am and 5:00 pm.

Trip generation calculations were based on the following peak condition period assumptions:

- 1-ton work trucks: It is anticipated that there would be approximately sixteen 1-ton work trucks that would make a trip to the work site and one trip out of the work site daily. It is assumed that 75 percent of the 1-ton work trucks would arrive and depart the work site within the peak hour of adjacent street traffic.
- 5-ton work trucks: It is anticipated that there would be approximately six 5-ton work trucks that would make a trip to the work site and one trip out of the work site daily. This category of truck would be on site periodically, as needed. It is assumed that 75 percent of the 1-ton work trucks would arrive and depart the work site within the peak hour of adjacent street traffic.
- Water Trucks: It is anticipated there would be approximately four water trucks that would make a trip into the work site and one trip out of the work site periodically as needed. It is assumed that one of the water trucks would arrive and depart the work site within the peak hour of adjacent street traffic.

Table 4.17-1 summarizes the trips generated by the project using the above assumptions.

Table 4.17-1: Pipeline Construction Phase Trip Generation

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peal Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
1-Ton Work Truck	16 (Per Day)	32	100% 13	0% 0	0% 0	100% 13
5-Ton Utility Flat Bed Truck	6 (Per Day)	12	100% 5	0% 0	0% 0	100% 5
Water Truck	4 (Per Day)	8	100% 1	0% 0	0% 0	100% 1
Total Trips		52	19	0	0	19

Source: Ruettgers & Schuler Civil Engineers 2023
Key:
ADT = average daily traffic

As shown in Table 4.17-1, the construction of the pipeline would generate approximately 52 daily trips, with 19 trips during the PM peak hour and 19 trips during the AM peak hour of a typical weekday.

CO_2 Injection Well Construction Phase

There are planned to be a total of six CO_2 injections wells constructed as part of the project. Construction activities are estimated to take approximately 18 days for each well.

Trip generation calculations for the O&M phase were based on the following assumptions:

- Passenger Car/Pickup Truck: It is anticipated there would be approximately six passenger car/pickup trucks, which would make a trip to the work site and one trip out of the work site daily.
- Heavy Duty Truck: It is anticipated there would be approximately two heavy duty trucks, which would make a trip to the work site and one trip out of the work site daily.

Table 4.17-2 summarizes the trips generated by the project using the above assumptions.

Table 4.17-2: CO_2 Injection Well Construction Phase

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peal Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
Passenger Car/Pickup Truck	6 (Per Day)	12	100% 6	0% 0	0% 0	100% 6
Heavy Trucks	2 (Per Day)	4	100% 2	0% 0	0% 0	100% 2
Total Trips		16	8	0	0	8

Source: Ruettgers & Schuler Civil Engineers 2023
Key:
ADT = average daily traffic
CO_2 = carbon dioxide

As shown in Table 4.17-2, the construction of the injection wells would generate approximately 16 daily trips, with eight trips during the PM and PM peak hours of a typical weekday.

CO_2 Compression and Pumping Facility Construction Phase

The CO_2 Compression and Pumping Facility construction phase would generally include personnel vehicles. Anticipated deliveries of materials and equipment would occur on off peak periods and sporadically. Deliveries were not included in the trip generation as they would generally be very low volumes and not a daily occurrence. These vehicles would access the facility pipeline along the route under construction at the time. Trip generation estimates for facility pipeline construction

traffic is presented in Table 4.17-2. Construction operations are anticipated to occur between 6:00 am and 5:00 pm.

Trip generation calculations were based on the following peak construction period assumptions:

- There would be approximately 80 construction personnel that would be on site daily. The following assumptions were made regarding carpool and peak hour travel:
  - A carpool factor of 1.25 was used, as a conservative assumption of personnel per vehicle.
  - With construction hours between 6:00 a.m. and 5:00 p.m., it is assumed that 75 percent of the personnel vehicles would arrive and depart the work site within the peak hour of adjacent street traffic.

Table 4.17-3 summarizes the trips generated by the project using the above assumptions.

Table 4.17-3: CO_2 Compression and Pumping Facility Construction Phase Trip Generation

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peal Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
Worker Vehicle	80 (Per Day)	160	100% 48	0% 0	0% 0	100% 48

Source: Ruettgers & Schuler Civil Engineers 2023
Key:
ADT = average daily traffic
CO_2 = carbon dioxide

As shown in Table 4.17-3, the construction of the CO_2 Compression and Pumping Facility would generate approximately 48 daily trips, with 48 trips during the PM peak hour and 48 trips during the AM peak hour of a typical weekday.

Operational Impacts

Operation of the project would include five full-time employees, who would operate the facility seven days a week, 24 hours a day. An additional five full-time employees could be on site at any time if repairs or other maintenance work is required.

Trip generation calculations for the O&M phase were based on the following assumptions:

- There would be approximately five full-time staff with an additional five employees which may be on site during maintenance or repair times on site daily. The following assumptions were made regarding peak hour travel:
  - One full time staff employee would enter and exit the facility during the peak hour of adjacent street traffic in both the AM and PM hours.

- Five maintenance/repair employees would enter and exit the site during the peak hour of adjacent street traffic in both the AM and PM hours.
- Each employee would make one inbound trip, and one outbound trip daily.

As shown in Table 4.17-4, operation of the project would generate approximately 20 daily trips, with seven trips during the PM peak hour and seven trips during the AM peak hour of a typical weekday. It is noted that the maintenance or repair work would occur periodically, and there would generally only be one trip in the peak hour.

Table 4.17-4: CO_2 Compression and Pumping Facility Operation and Maintenance Phase Trip Generation

Traffic Type	Variable	ADT	AM Peak Hour Trips		PM Peak Hour Trips	
			In Trips	Out Trips	In Trips	Out Trips
Worker Vehicle	10 (Per Day)	20	86% 6	14% 1	14% 1	86% 6

Source: Ruettgers & Schuler Civil Engineers 2023
Key:
ADT = average daily traffic
CO_2 = carbon dioxide

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist state that a project would normally be considered to have a significant impact if it would:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
- Conflict or be inconsistent with CEQA Guidelines § 15064.3 (b).
- Substantially Increase Hazards due to a Design Feature (e.g., Sharp Curves or Dangerous Intersections) or Incompatible Uses.
- Result in Inadequate Emergency Access.

Impact 4.17-1: The Project would conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.

There are no dedicated pedestrian or bicycle facilities in the immediate vicinity of the project site or along the surrounding roadways. Due to the rural nature of the project area, pedestrian and bicycle traffic is limited. The project would not be located along an existing bus route and few bus

stops exist on roadways that are likely to be used during construction and operation of the proposed project.

Additionally, the proposed project would generate 52 trips in either the AM or PM peak hour during construction, and seven trips in the AM or PM during operation. Construction and operation of the project would not disrupt normal traffic flows or otherwise conflict with the County's roadway performance policies and programs. Therefore, impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.17-2: The Project would conflict or be inconsistent with CEQA Guidelines § 15064.3 (b).

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 driver delay to reduction of vehicular greenhouse gas emissions through creation of multimodal networks, and creation of a mix of land uses that can facilitate fewer and shorter vehicle trips. Construction traffic would be temporary and would not permanently affect VMT characteristics in this part of Kern County or elsewhere. Long-term, operational traffic related to the CO_2 storage, maintenance, and monitoring activities would be limited. It is not known where the employees would live, or how long their commuting trips would be, but is assumed that they would commute from nearby communities. According to technical guidance issued by the Office of Planning and Research, projects generating less than 110 or fewer daily vehicle trips may be presumed to have a less-than-significant impact involving VMT.

Because the proposed project would generate up to 52 trips in either the AM or PM peak hour during construction, and seven trips in the AM or PM during operation, the project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3. Therefore, impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.17-3: The project would substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

No new roadway design or features (i.e., sharp curves, dangerous intersections, or other hazardous features) that could result in transportation-related hazards or safety concerns are anticipated. The project injection wells, and other infrastructure and facilities would be set back from roadways, as required by the Kern County Zoning Ordinance. The types and numbers of vehicles utilized during injection well construction and for storage, maintenance, and monitoring activities would be like existing activities in the vicinity, therefore, would not likely be incompatible.

The introduction of construction-related traffic would have the potential to increase accident rates and could result in significant impacts; however, the implementation of Mitigation Measure (MM) 4.17-1, as listed below, would require information be provided regarding any movement of oversized/overweight vehicles that would require transport over publicly maintained State or County roads. Additionally, the project proponent shall provide a Construction Traffic Control Plan for Kern County and Caltrans approval. Therefore, implementation of MM 4.17-1 would be required to reduce potential construction-related traffic impacts to a less-than-significant level.

Mitigation Measures

MM 4.17-1 Prior to the issuance of construction or building permits, the project proponent/operator shall provide a written statement of any movement of oversized/ overweight vehicles that would require transport over publicly maintained State or County roads. The following shall be implemented for any such transport:

1. Obtain all necessary encroachment permits for work within the road right-of-way, or use of oversized/overweight vehicles that will utilize County-maintained roads, which may require California Highway Patrol or a pilot car escort. Copies of the approved traffic plan and issued permits shall be submitted to the Kern County Planning and Natural Resources Department and the Kern County Public Works Department-Development Review.
2. Prepare and submit a Construction Traffic Control Plan to Kern County Public Works Department-Development Review and the California Department of Transportation offices for District 9, as appropriate, for approval. The Construction Traffic Control Plan must be prepared in accordance with both the California Department of Transportation Manual on Uniform Traffic Control Devices and Work Area Traffic Control Handbook and must include, but not be limited to, the following issues:
    a. Timing of deliveries of heavy equipment and building materials.
    b. Directing construction traffic with a flag person.
    c. Placing temporary signing, lighting, and traffic control devices if required, including, but not limited to, appropriate signage along

access routes to indicate the presence of heavy vehicles and construction traffic.

d. Ensuring access for emergency vehicles to the project site.

e. Temporarily closing travel lanes or delaying traffic during materials delivery, transmission line stringing activities, or any other utility connections.

f. Maintaining access to adjacent property.

g. Specifying both construction-related vehicle travel and oversize load haul routes, minimizing construction traffic during the AM and PM peak hour, distributing construction traffic flow across alternative routes to access the project sites, and avoiding residential neighborhoods to the maximum extent feasible.

h. Institute construction work hours as necessary, such that the arrival and/or departure times of workers would be staggered, as necessary.

i. Identifying vehicle safety procedures for entering and exiting site access roads.

Level of Significance after Mitigation

Impacts would be less than significant with mitigation.

Impact 4.17-4: The project would result in inadequate emergency access.

The project would generate construction trips, including the movement of oversize equipment, and the potential for roadway lane closures exist to the sites during construction. These factors could temporarily increase the daily traffic volumes on surrounding local roadways and at intersections. It is anticipated that emergency access would be maintained at all times, and appropriate detours would be provided, as necessary.

While the project would not require closures of public roads, which could inhibit access by emergency vehicles, during construction, heavy construction-related traffic could interfere with emergency response or emergency evacuation procedures in the event of an emergency, such as a wildfire or a chemical spill. Heavy construction-related traffic could also interfere with emergency response to other uses in the vicinity and, therefore, could represent a significant impact.

To ensure emergency access during construction, MM 4.17-1 requires the preparation of a Construction Traffic Control Plan and includes assurance of access for emergency vehicles and would therefore reduce potential impacts to less than significant.

Mitigation Measures

Implement MM 4.17-1, as described above.

Level of Significance after Mitigation

Impacts would be less than significant.

4.17.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed in amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, SB 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. CalGEM permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to transportation is considered the western portion of Kern County. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on transportation resources. This geographic scope of analysis is appropriate because the transportation resources within this area are expected to be similar to those in the project site because of their proximity.

Impact 4.17-5: Contribute to Cumulative Transportation Impacts

With regard to impacts to significant transportation resources, the project has the potential to contribute significantly to cumulative impacts within the region. A complete analysis of the cumulative impacts of the various ground disturbing activities from oil and gas are provided in Section 4.16, *Transportation and Traffic Resources* of the 2015 Final EIR. Through implementation of MM 4.17-1, direct impacts to transportation resources would be avoided.

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 very 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 explained, the thresholds established by the Caltrans Guide for the Preparation of Traffic Impact Studies states that project must generate 50 or more trips in the peak hour to warrant the analysis of a roadway facility. As is shown in the trip generation tables above, the various components of the project are not anticipated to generate more than 48 trips in either the AM or PM peak hour during the construction phase. There may be periodic overlap of the construction phases, but only for a limited time, and the construction activities are limited to within the existing Elk Hills facility boundaries. Therefore, due to the amount of peak hour trips being generally less than 50 trips in the peak hour, construction of the project would also result in less-than-significant cumulative impacts.

On the project-level, the project would not include a design feature or utilize vehicles with incompatible uses that would create a hazard on the surrounding roadways with implementation of mitigation measures. Additionally, implementation of MM 4.17-1 would ensure the project's contribution to emergency access and design hazards are reduced to a less than cumulatively considerable level.

Mitigation Measures

Implement MM 4.17-1, as described above.

Level of Significance after Mitigation

Cumulative impacts would be less than significant.

Section 4.18

Tribal Cultural Resources

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Section 4.18

Tribal Cultural Resources

4.18.1 Introduction

This section of the Environmental Impact Report (EIR) provides contextual background information on tribal cultural resources and regulatory setting for the resource. It also describes the impacts on tribal cultural resources that could result from implementation of the California Resources Corporation's (project proponent) proposed Carbon TerraVault I (Kern County) Project (project). The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

The analysis in this section is based on the results of the Native American consultation conducted by the Kern County (County) for purposes of compliance with Assembly Bill 52 (AB 52), located in Appendix J.

Tribal Cultural Resource Terminology

As explained in Section 4.5, *Cultural Resources*, historical resources can include areas determined to be important to Native Americans, such as "sacred sites." Sacred sites are most often important to Native American groups because of the role of the location in traditional ceremonies or activities. "Cultural resources" generally refer to prehistoric and historical period archaeological sites and the built environment. Cultural resources can also include areas determined to be important to Native Americans.

For the purpose of this Tribal Cultural Resources section, the "project footprint" is defined as the area encompassing the project and associated infrastructure. See Section 4.5, *Cultural Resources*, for definitions of key tribal cultural resources terms used in this section.

4.18.2 Environmental Setting

Refer to Section 4.5, *Cultural Resources*, of this EIR for a greater discussion of the tribal cultural resources environmental setting.

Existing Tribal Cultural Resources

Native American AB 52 Consultation

Per California Public Resources Code (PRC) Section 21080.3.1, Assembly Bill (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, the lead agency must 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 PRC Section 21073) and who have requested in writing to be informed by the lead agency (PRC Section 21080.3.1(b)). Tribes interested in consultation must respond in writing within 30 days from receipt of the lead agency's formal notification, and the lead agency must begin consultation within 30 days of receiving the tribe's request for consultation (PRC Sections 21080.3.1(d) and 21080.3.1(e)).

As such, the County sent outreach letters to appropriate contacts of California Native American Tribes affiliated with the geographic area of the project in accordance with PRC Section 21070 on February 25, 2022. One response was received by the San Manuel Band of Mission Indians as a result of the outreach indicating that they would not request consultation for the project. The results of tribal outreach for AB 52 Consultation are summarized below in Table 4.18-1.

Table 4.18-1: Assembly Bill 52 Consultation Results

Tribe	Attempts	Response
San Manuel Band of Mission Indians	Email: 02/25/2022	"Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above-referenced project. SMBMI appreciates the opportunity to review the project documentation, which was received by the Cultural Resources Management Department on March 2nd. The proposed project is located outside of Serrano ancestral territory and, as such, SMBMI will not be requesting to receive consulting party status with the lead agency or to participate in the scoping, development, or review of documents created pursuant to legal and regulatory mandates."
Tejon Tribe	Email: 02/25/2022	No response.
Torres Martinez Desert Cahuilla	Email: 02/25/2022	No response.
Twenty-Nine Palms Band of Mission Indians	Email: 02/25/2022	No response.

Sacred Lands File Search

A Sacred Lands File (SLF) search also was requested from the Native American Heritage Commission (NAHC). Outreach letters were sent to tribal organizations on the NAHC contact list on December 23, 2022, and follow-up emails were sent on the February 28, 2023. A total of three responses were received as a result of the outreach: the Yak tityu tityu yak tilhini- Northern Chumash deferred to the Tejon Tribe, the Santa Ynez Band of Chumash Indians indicated they would not request consultation for the project, and the Tule River Indian Tribe responded that they would like to continue consultation and requested the results of any cultural assessment and possibly a site visit. This report has been sent to the Tule River Indian Tribe, and any continued correspondence will be forwarded to the County of Kern. The results of the SLF search tribal outreach are summarized below in Table 4.18-2.

Table 4.18-2: Sacred Lands File Search

Tribe	Attempts	Response
Big Pine Paiute Tribe of the Owens Valley	Mailer: 12/23/2022 Email: 02/28/2023	No response
Chumash Council of Bakersfield	Mailer: 12/23/2022 Email: 02/28/2023	No response
Coastal Band of the Chumash Nation	Mailer: 12/23/2022 Email: 02/28/2023	No response
Kitanemuk & Yowlumne Tejon Indians	Mailer: 12/23/2022 Email: 02/28/2023	No response
Salinan Tribe of Monterey, San Luis Obispo Counties	Mailer: 12/23/2022 Email: 02/28/2023	No response
Santa Ynez Band of Chumash Indians	Mailer: 12/23/2022 Email: 02/28/2023	"Thank you for contacting the Tribal Elders' Council for the Santa Ynez Band of Chumash Indians. We acknowledge that the Project may impact cultural resources and hope that you are consulting with local tribes. At this time, the Elders' Council requests no further consultation on the Project; however, we understand that as part of NHPA Section 106, we must be notified of the Project. Thank you for remembering that at one time our ancestors walked this sacred land."
Tejon Indian Tribe	Mailer: 12/23/2022 Email: 02/28/2023	No response
Tule River Indian Tribe	Mailer: 12/23/2022 Email: 02/28/2023	"Thank you for your letter dated 12/23/22 regarding the Carbon Terra Vault I Project in Elk Hills, Kern County CA. At this time, we do not have any specific information regarding culturally important items or sites within the proposed project are. We would, however, like to continue consultation with you regarding this project at this time, and are interested in results from any cultural assessments that are conducted. We also may be interested in making a site visit, if warranted, since resources were found. This can be determined in the future."
Yak tityu tityu yak tilhini-Northern Chumash	Mailer: 12/23/2022 Email: 02/28/2023	"Thank you for reaching out to our Tribe. We have no comments on this project at this time. We defer to the Tejon Tribe."

The records searches, supplemental research, and consultation did not reveal any known cemeteries or burial sites within the Area of Potential Effects of the project. No Native American sacred sites or human burials are known to be located within the project site boundaries.

4.18.3 Regulatory Setting

Federal

There are no applicable federal regulations for this issue area.

State

Native American Heritage Commission

Section 5097.91 of the California PRC established the NAHC, whose duties include the inventory of places of religious or social significance to Native Americans and the identification of known graves and cemeteries of Native Americans on private lands. Section 5097.98 of the PRC specifies a protocol to be followed when the NAHC receives notification of a discovery of Native American human remains from a county coroner.

Assembly Bill 52 and Related Public Resource Code Sections

AB 52 was approved by California State Governor Edmund Gerry "Jerry" Brown, Jr. on September 25, 2014. The act amended California PRC Section 5097.94, and added PRC Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3. AB 52 applies specifically to projects for which a Notice of Preparation or a Notice of Intent to Adopt a Negative Declaration or Mitigated Negative Declaration (MND) will be filed on or after July 1, 2015. The primary intent of AB 52 was to include California Native American Tribes early in the environmental review process and to establish a new category of resources related to Native Americans that require consideration under CEQA, known as tribal cultural resources. PRC Section 21074(a)(1) and (2) defines tribal cultural resources 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 or included in a local register of historical resources, or a resource that is determined to be a tribal cultural resource by a lead agency in its discretion and supported by substantial evidence. On July 30, 2016, the California Natural Resources Agency adopted the final text for tribal cultural resources update to Appendix G of the CEQA Guidelines, which was approved by the Office of Administrative Law on September 27, 2016.

PRC Section 21080.3.1 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, the lead must 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 PRC Section 21073) and who have requested in writing to be informed by the lead agency (PRC Section 21080.3.1(b)). Tribes interested in consultation must respond in writing within 30 days from receipt of the lead agency's formal notification and the lead agency must begin consultation within 30 days of receiving the tribe's request for consultation (PRC Sections 21080.3.1(d) and 21080.3.1(e)).

PRC Section 21080.3.2(a) identifies the following as potential consultation discussion topics: the type of environmental review necessary, the significance of tribal cultural resources, the significance of the project's impacts on the tribal cultural resources, project alternatives or appropriate measures for preservation, and mitigation measures. Consultation is considered concluded when either: (1) the parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or (2) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached (PRC Section 21080.3.2(b)).

If a California Native American tribe has requested consultation pursuant to Section 21080.3.1 and has failed to provide comments to the lead agency, or otherwise failed to engage in the consultation process, or if the lead agency has complied with Section 21080.3.1(d) and the California Native American tribe has failed to request consultation within 30 days, the lead agency may certify an EIR or adopt an MND (PRC Section 21082.3(d)(2) and (3)).

PRC Section 21082.3(c)(1) states that any information, including, but not limited to, the location, description, and use of the tribal cultural resources, that is submitted by a California Native American tribe during the environmental review process would not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public without the prior consent of the tribe that provided the information. If the lead agency publishes any information submitted by a California Native American tribe during the consultation or environmental review process, that information would 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.

California Public Records Act

Sections 6254(r) and 6254.10 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 maintained by the Native American Heritage Commission." Section 6254.10 specifically exempts from disclosure requests for "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 NAHC, 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."

Local

Kern County General Plan

The project site is located within the KCGP. The project would be subject to applicable policies and measures of the KCGP. The Land Use, Open Space, and Conservation Element of the KCGP include the following policies and implementation measures related to cultural resources that would apply to the project:

Chapter 1. Land Use, Open Space, and Conservation Element

1.10.3. – Archaeological, Paleontological, Cultural, and Historical Preservation

Policy

Policy 25. The County will promote the preservation of cultural and historic resources that provide ties with the past and constitute a heritage value to residents and visitors.

Implementation Measures

Implementation Measure 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.

Implementation Measure 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.

4.18.4 Impacts and Mitigation Measures

Methodology

The project's potential impacts to tribal cultural resources have been evaluated using a variety of resources, including an SLF search conducted by the NAHC. AB 52 notification letters were sent to Native American groups and individuals indicated by the NAHC to solicit information regarding the presence of tribal cultural resources. Using the aforementioned resources and professional judgment, impacts were analyzed according to CEQA significance criteria described below.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist identify the following criteria, as established in Appendix G of the CEQA Guidelines, to determine if a project could potentially have a significant adverse effect on tribal cultural resources.

A project would normally be considered to have a significant impact if it would:

- 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, 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.

Project Impacts

Impact 4.18-1a: The project would 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).

Neither the SLF searches conducted by the NAHC, nor the AB 52 consultation indicated the presence of known tribal cultural resources within or immediately adjacent to the project site. The Tule River Indian Tribe replied that they do not possess any specific information regarding known tribal cultural resources; however, they requested to receive results of any subsequent studies.

Construction, grading, and excavation activities have the potential to unearth previously undiscovered, intact tribal cultural materials. If such materials, including human remains, are found, a potentially significant impact may occur. The project would implement Mitigation Measure (MM) 4.5-1 (see Section 4.5, *Cultural Resources)*, which requires that qualified Native American monitors be retained from a Kern County federally recognized tribe for all construction activities.

Additionally, implementation of MM 4.18-1 requires tribal consultation letters be sent to tribal organizations listed on the NAHC contact list by the applicant prior to issuance of a building or grading permit and annually by January 31 of each subsequent year of operation.

Pursuant to Section 21080.3.2(b)(1) of AB 52, the lead agency considers the consultation concluded, as the parties have agreed to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource in the event that a tribal cultural resource is uncovered during construction or operation activities.

However, the lead agency notes that that Section 21080.3.2 (c) of AB 52 states a follows:

(1) This section does not limit the ability of a California Native American tribe or the public to submit information to the lead agency regarding the significance of the tribal cultural resources, the significance of the project's impact on tribal cultural resources, or any appropriate measures to mitigate the impact.

(2) This section does not limit the ability of the lead agency or project proponent to incorporate changes and additions to the project as a result of the consultation, even if not legally required.

Mitigation Measures

MM 4.18-1 Prior to issuance of grading or building permit, the owner/operator shall send individual notification letters to all Native American Tribes listed by the California Native American Heritage Commission for the area covered by the CUP. The notification letter shall include a site plan, list of APNs included in the CUP and contact information for the owner/operator. After operation, the notification letter shall be sent annually by January 31 of each year. A final letter shall be sent as part of the closure plan with contacts for the managing entity for long-term managing and monitoring. The owner/operator shall provide reasonable access and consultation for any tribal representative with concerns or questions about tribal resources that may be within the CCS Surface Land Area or facilities within the CUP.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.18-1b: The project would 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.

As noted in Impact 4.18-1a, construction, grading, and excavation activities have the potential to unearth previously undiscovered, intact tribal cultural materials, which could cause a significant impact on found materials, including human remains.

The project would implement MM 4.5-1, MM 4.5-3, and MM 4.18-1 to reduce significant impacts to tribal cultural resources. Adherence to MM 4.5-1 requires that qualified Native American monitors be retained from a Kern County federally recognized tribe for all construction activities. MM 4.5-3 (see Section 4.5, *Cultural Resources*) further requires all work to immediately stop if any human remains are uncovered during project construction and the procedures and protocols set forth in Section 15064.5 (e)(1) of the CEQA Guidelines be implemented. For continued coordination with Native American Tribes, MM 4.18-1 requires tribal consultation letters be sent to tribal organizations listed on the NAHC contact list by the project proponent/owner prior to issuance of a building or grading permit and annually by January 31 of each subsequent year of operation.

Mitigation Measures

Implement MM 4.5-1, MM 4.5-3, and MM 4.18-1.

Level of Significance after Mitigation

Impacts would be less than significant.

4.18.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development, including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting*, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an Addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provide evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities, and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate

Bill (SB) 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. California Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to tribal cultural resources includes the western portion of Kern County. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on tribal cultural resources. This geographic scope of analysis is appropriate because the tribal cultural resources within this area are expected to be similar to those in the project site because of their proximity, their similarities in environments and landforms, and their location within the same Native American tribal territories. This is a large enough area to encompass any effects of the project on tribal cultural resources that may combine with similar effects caused by other projects, and provides a reasonable context wherein cumulative actions could affect tribal cultural resources.

Impact 4.18-2: Contribute to Cumulative Tribal Cultural Resource Impacts

With regard to impacts to significant tribal cultural resources, the project has the potential to contribute significantly to cumulative impacts within the region. A complete analysis of the cumulative impacts of the various ground disturbing activities from oil and gas are provided in Section 4.5, *Cultural and Paleontological Resources* (2015 Final Oil and Gas EIR). Through implementation of MM 4.5-1, MM 4.5-3, and MM 4.18-1, direct impacts to tribal cultural resources would be avoided, if feasible. If a significant tribal cultural resource cannot be avoided, MM 4.5-1 would ensure that significant impacts are reduced by testing or data recovery.

Potential impacts to tribal cultural resources, in combination with other projects in the area, could contribute to a cumulatively significant impact due to the overall loss of resources unique to tribes present within the region. As discussed above, no tribal cultural resources were identified; however, there is potential for unanticipated and previously unidentified tribal cultural resource discovery during project construction or operation activities.

The project would implement MM 4.5-1 to monitor construction and treat newly discovered sites, thus reducing the project impacts.

Implementation of MM 4.18-1 requires tribal consultation letters be sent to tribal organizations listed on the NAHC contact list by the applicant prior to issuance of a building or grading permit and annually by January 31 of each subsequent year of operation. As a result of consultation, appropriate parties have agreed to measures to mitigate or avoid a significant effect, if a significant

effect exists, on a tribal cultural resource in the event that a tribal cultural resource is uncovered during construction or operation activities.

In addition, the other projects identified in Section 3.9, *Cumulative Projects*, would also be expected to have mitigation measures that would reduce potential impacts on tribal cultural resources.

Therefore, impacts of the project would not have the potential to combine with impacts from past, present, or reasonably foreseeable projects to result in a cumulative impact to tribal cultural resources and cumulative impacts would be less than significant.

Mitigation Measures

Implement MM 4.5-1, MM 4.5-3, and MM 4.18-1.

Level of Significance after Mitigation

Cumulative impacts would be less than significant.

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Section 4.19

Utilities and Service Systems

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Section 4.19

Utilities and Service Systems

4.19.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for utilities and service systems. It also describes the impacts on utilities and service systems that would result from implementation of the California Resources Corporation's (project proponent, or CRC) proposed Carbon Terra Vault 1 (Kern County) Project (project). The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. The Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the City of Taft, and approximately 4 miles from the unincorporated community of Buttonwillow.

The information and analysis in this section is based in part on the project-specific Water Supply Assessment (WSA) (Quad Knopf 2023) (see Appendix G-2) and the groundwater and Sustainable Groundwater Management Act (SGMA) planning information presented in Section 4.10, *Hydrology and Water Quality*, in this EIR. This section describes the impacts to utilities and service systems in relation to water supply and the implementation of the SGMA that would result from implementation of the proposed project, as well as mitigation measures that would reduce these impacts.

4.19.2 Environmental Setting

The proposed project site is located within Elk Hills, which comprises an approximately 75-square mile (47,800-acre) complex in the San Joaquin Valley of unincorporated Kern. The project area is bounded by Kings and Tulare Counties to the north, Santa Barbara and San Luis Obispo Counties to the west, the Tehachapi Mountains and the Sierra Nevada to east, and the northern boundary of the Los Padres National Forest to the south.

The project area is characterized by heavy oil and gas exploration and production including existing well pads, processing facilities, pipeline routes, and access roads. Development in the surrounding area is predominantly oil and gas production, agricultural, and municipalities such as the towns of McKittrick, Tupman, Taft, and Buttonwillow. The project area boundaries encompass a mix of parcels that have been owned and used for oil and gas production or on which leases have been acquired by the project proponent. The nearest urbanized areas to the project site in Kern County (County) are within the boundaries of the City of Bakersfield (approximately 26 miles), the City of Taft (approximately 7 miles), and the unincorporated community of Buttonwillow (approximately 4.5 miles).

A WSA report was prepared for the proposed project by Quad Knopf, Inc. (2023) (see Appendix G-2). The WSA utilizes criteria in California Water Code, as amended in 2002 by the passage of

Senate Bill (SB) 610. The project would not be served by a public water system, and the WSA was prepared to determine whether "the total projected water supplies, determined to be available by Kern County for the project during normal, single-dry, and multiple-dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses" (Quad Knopf 2023) The following sections describe water supply for the proposed project.

Water Supply/Groundwater Supply

There are typically three sources of supply water for development: (1) natural sources, (2) manmade sources, and (3) reclamation. Natural sources include rivers, lakes, streams, and groundwater stored in aquifers. Human-created sources include runoff water that is treated and stored in reservoirs and other catchment structures. Reclaimed water is wastewater that has been conveyed to a treatment plant and then treated to a sufficient degree that it may again be used for certain uses, such as irrigation. However, reclaimed water is not potable (drinkable) and must be conveyed in a separate system to ensure that there is no possibility of direct human consumption.

The project site is in an area without a public water purveyor that can practicably provide water for the project. The only practicable water source for the project is the underlying Kern County subbasin.

The project site is within the West Kern Water District (WKWD, or District), which is within the Tulare Lake Hydrologic Region, San Joaquin Valley Groundwater Basin. The project site is above the Kern County Hydrologic Region, for which the Kern Groundwater Authority (KGA) is the principal groundwater management agency. The Kern County subbasin is the specific groundwater subbasin in which the District and project resides and has a surface area of approximately 1,945,000 acres. Groundwater in the subbasin will be used to supply water for the project. The project is located within the WKWD Groundwater Sustainability Agency (GSA), which is a member of the KGA. The WKWD primarily pumps groundwater, but balances this extraction by recharging its State Water Project (SWP) water and other supplemental water supplies. Water supply is obtained within the District from wells located in the northeast corner of the District in the underflow area of the Kern River Basin and from an area north and adjacent to the State of California's Tule Elk Reserve. Table 4.19-1 tabulates the existing and anticipated future water supplies for the WKWD.

The KGA GSA covers approximately 1.2 million acres of the Kern County Subbasin's approximate 1.8 million acres, as defined by the California Department of Water Resources (DWR) Bulletin 118. The subbasin, as a whole, has an overdraft of 324,326 acre-feet per year over the baseline conditions of which the KGA is approximately 239,346 acre-feet of the deficit. The KGA members have sources of water supplies such as local streams (Caliente, Poso Creek), Kern River, SWP, and Central Valley Project sources.

Table 4.19-1: Water Supplies - Current and Projected

Water Source	2020		2025	2030	2035	2040	2045
	Actual Volume	Level of Treatment of Source Water					
Purchased Water	0	-	0	0	0	0	0
Groundwater (recovered from local bank)	15,415	Disinfection	14,795	14,870	14,947	15,026	15,106
Imported Surface water	103	None	18,396	18,207	18,050	17,892	17,735
Recycled Water	0	-	0	0	0	0	0
Desalinated Water	0	-	0	0	0	0	0
Stormwater Use	0	-	0	0	0	0	0
Transfers							
Buena Vista WSD	5,000	None	6,500	6,500	6,500	6,500	6,500
Exchanges							
Santa Clarita Return	-500	-	-	-	-	-	-
Rosedale-Rio Bravo WSD	0	None	-	-	-	-	-
Kern Tulare WD	-2,986	None	650	650	650	-	-
Total	17,032	-	40,341	40,227	40,147	39,418	39,340
Estimated Demands	16,338	-	17,356	17,448	17,542	17,637	17,735

Source: Quad Knopf, Inc. 2023
Key:
- = not applicable
WD = District
WSD = Water Storage District

Wastewater

No septic systems or sewer infrastructures is currently located within the project site.

Stormwater Drainage

The project site is in a region with no existing or planned stormwater infrastructure. There are no existing stormwater drainage systems on the project site.

Solid Waste

Solid waste is a mixture of items discarded as useless or unwanted arising from residential, commercial, industrial, institutional, agricultural, and mining activities. These wastes include construction and demolition (C&D)-generated waste as well as inert wastes.

The Kern County Public Works Department Waste and Recycling Division provides environmentally safe management of solid waste and is responsible for operating seven landfills, five transfer stations, and three bin sites throughout the County.

In most cases, solid waste is hauled directly to Class III landfills, with the remainder being taken to transfer stations, resource recovery centers, or refuse-to-energy facilities. Class III landfills typically handle the disposal of non-hazardous waste. The general waste classifications utilized by the Kern County Public Works Department Waste and Recycling Division are:

- Non-hazardous solid waste, which consists mostly of household garbage, commercial wastes, agricultural waste, and litter
- Special waste, which is any waste that requires special handling, including infectious waste, pesticide containers, sewage sludge, oilfield waste, household hazardous waste, and asbestos waste
- Designated waste, which is a waste that consists of or contains pollutants that could be released at concentrations in excess of applicable water quality objectives and standards or hazardous waste that has been granted a variance from hazardous waste management requirements
- Hazardous waste, which is a waste that, because of its quantity, concentration, physical, chemical, or infectious characteristics, may either: (a) cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, or (b) pose a substantial present or potential hazard to human health or the environment when improperly managed
- Industrial wastes, which are hazardous and non-hazardous by-products produced by oil and gas extraction, pesticide, paper, petrochemical, rubber, plastics, electronics, and other industries

Not all of the above-defined wastes may be disposed of at a landfill. State law regulates the disposal of wastes at landfills.

Kern County is responsible for compliance with the California Integrated Wastewater Management Act of 1989, Assembly Bill (AB) 939. AB 939 requires that cities and counties reduce the amount of solid waste being sent to landfills by 50 percent by January 1, 2000, and requires cities and counties to prepare solid waste planning documents per AB 939. These documents include the Source Reduction and Recycling Element, the Household Hazardous Waste Element, and the Non-Disposal Facility Element. All three of these documents have been approved for Kern County, as well as an Integrated Waste Management Plan approved February 1998 by the California Integrated

Waste Management Board. The Kern County Integrated Waste Management Plan is the long-range planning document for landfill facilities.

Landfills

The Kern County Public Works Department operates seven recycling and sanitary landfills throughout the County. Landfills are located in Bakersfield, Boron, Mojave-Rosamond, Ridgecrest, Shafter-Wasco, Taft, and Tehachapi (Kern County Public Works Department 2023). No solid waste is currently generated at the project site. The project would likely be served primarily by the Taft Landfill, located at 13351 Elk Hills Road approximately 9 miles south of the project site. This landfill accepts batteries, clean dirt, clean inerts (e.g. source separated asphalt, brick, and concrete); C&D waste (e.g. asphalt, brick, concrete, dirt, and metal), dead animals, electronic waste, green waste, ordinary household trash, tires, treated wood waste, and used motor oil (Kern County Public Works Department 2023).

Electric Power, Natural Gas, and Telecommunications

The Elk Hills Power Plant is located within Elk Hills and is a nominal 550-megawatt (MW) combined-cycle, natural gas-fired, cogeneration power generating plant. The plant delivers electricity to the plant 230-kilovolt switchyard, which then is transmitted via a generation tie line to the interconnection point at the Pacific Gas and Electric's (PG&E) Midway substation. The project site is crossed by public utilities, including several PG&E electric transmission lines over the eastern portion of the project site. The Elk Hills Power Plant provides about one third of its power to Elk Hills and the other two thirds onto the California power grid via an onsite switching station and twin 230-kilowatt conductors running north to the PG&E substation in Buttonwillow (approximately 8.5 miles north of the plant). Southern California Gas is the natural gas provider in this area of Kern County.

4.19.3 Regulatory Setting

Federal

Safe Drinking Water Act

The Safe Drinking Water Act of 1974 (SDWA) gave the U.S. Environmental Protection Agency (EPA) the authority to set standards for contaminants in drinking water supplies. The EPA was required to establish primary regulations for the control of contaminants that affected public health and secondary regulations for compounds that affect the taste, odor, and aesthetics of drinking water. Under the provisions of the SDWA, the California Department of Health and Human Services (CalHHS) has primary enforcement responsibility. Title 22 of the California Administrative Code establishes CalHHS authority and stipulates State drinking water quality and monitoring standards. For additional information concerning regulatory updates and implementation of programs concerning the protection of underground sources of drinking water in accordance with the SDWA, including Class II well operations in the Project Area, the Underground Injection Control (UIC) program and updated UIC regulations, and the ongoing

aquifer exemption program being implemented by the California Geologic Energy Management Division (CalGEM) and the EPA, see Section 4.9.2, *Hydrology and Water Quality*, Environmental Setting and Section 4.9.3, *Regulatory Setting*.

State

Energy

EnergyCalifornia's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24 Building Standards)

The California Energy Commission administers Title 24 Building Standards, which were first adopted in 1976 in response to a legislative mandate to reduce California's energy consumption. Standards are periodically updated to allow consideration and possible incorporation of new energy efficiency technologies and methods. California's building efficiency standards are updated on an approximately three-year cycle. The 2019 Building Standards focus on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings. The 2019 Building Standards went into effect on December 12, 2018, following approval of the California Building Standards Commission.

Water

Water Code Sections 10910 et seq.

Water Code Section 10910 et seq. were amended by SB 610 in 2001, as well as by SB 1262 in 2016, to require that a WSA be prepared by a public water system for certain projects subject to CEQA, including:

- A proposed residential development of more than 500 dwelling units
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space
- A proposed hotel or motel, or both, having more than 500 rooms
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area
- A mixed-use project that includes one or more of the projects specified in this subdivision
- A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling-unit project

SB 1262 included amendments to incorporate groundwater management requirements under the SGMA into California water laws required by CEQA. Water Code Section 10910(b) further provides that the CEQA lead agency may prepare the WSA if a public water system that may supply water for the project cannot be identified. As discussed above, no public water system would provide more than a small portion of the water required for oil and gas activities in the project area.

Sustainable Groundwater Management Act

In 2014, California enacted the SGMA (Water Code Section 10720 et seq.). This act, and related amendments to California law, require that all groundwater basins designated as high- or medium-priority in the DWR California Statewide Groundwater Elevation Monitoring program, and that are subject to critical overdraft conditions, must be managed under a new Groundwater Sustainability Plan (GSP) or a coordinated set of GSPs by January 31, 2020. High- and medium-priority basins that are not subject to critical overdraft conditions must be managed under a GSP by January 31, 2022. Where GSPs are required, one or more local GSAs must be formed to cover the basin and prepare and implement applicable GSPs. The SGMA does not apply to basins that are managed under a court-approved adjudication, or to low- or very low-priority basins.

A GSA has the authority to require registration of groundwater wells, measure and manage extractions, require reports and assess fees, and request revisions of basin boundaries, including establishing new subbasins. The preparation of a GSP by a GSA is exempt from CEQA. Each GSP must include a physical description of the covered basin, such as groundwater levels, groundwater quality, subsidence, information on groundwater–surface water interaction, data on historical and projected water demands and supplies, monitoring and management provisions, and a description of how the plan will affect other plans, including city and county general plans. The SGMA requires that a GSP ensure that, within 20 years after plan adoption, the following "undesirable results" are avoided:

- Chronic lowering of groundwater levels (not including overdraft during a drought, if a basin is otherwise managed)
- Significant and unreasonable reductions in groundwater storage
- Significant and unreasonable seawater intrusion
- Significant and unreasonable degradation of water quality
- Significant and unreasonable land subsidence
- Surface water depletions that have significant and unreasonable adverse impacts on beneficial uses (Water Code Section 10721(w))

The current status of SGMA regulatory requirements in the project area, including basin and subbasin priority designations and the WKWD GSA, is discussed in Section 4.10.3, *Regulatory Setting*, of Section 4.10, *Hydrology and Water Quality.*

The DWR has determined that processed water generated by oil and gas production is not groundwater. A comprehensive, detailed record of the groundwater in the Kern County basins, that

include both the project and cumulative projects, and the SGMA plans, are provided in Section 4.9, *Hydrology and Water Quality* of the Kern County Oil and Gas Supplemental Recirculated EIR (2020/2021).

The SGMA allows for multiple GSPs implemented by multiple GSAs and coordinated pursuant to a single coordination agreement that covers the entire basin to be an acceptable planning scenario (Water Code § 10727). In the San Joaquin Valley Kern County Subbasin, six GSPs were prepared by 17 GSAs for the various management areas established in the subbasin pursuant to the coordination agreement and submitted to the California V for review. Collectively, the six GSPs and the coordination agreement are referred to as the Plan for the Subbasin. Individually, the GSPs include the following:

- Kern Groundwater Authority Groundwater Sustainability Plan, amended July 2022, prepared by the KGA GSA, Semitropic Water Storage District GSA, Cawelo Water District GSA, City of McFarland GSA, Pioneer GSA, WKWD GSA, and Westside District Water Authority GSA
- Amended Kern River Groundwater Sustainability Plan, July 2022, prepared by the Kern River GSA and Greenfield County Water District GSA
- Buena Vista Water Storage District GSA Groundwater Sustainability Plan, July 2022, prepared by the Buena Vista Water Storage District GSA
- Olcese Groundwater Sustainability Agency Groundwater Sustainability Plan, July 2022, prepared by the Olcese Water District GSA
- Henry Miller Water District Groundwater Sustainability Plan, July 2022, prepared by the Henry Miller Water District GSA
- South of Kern River Groundwater Sustainability Plan, July 2022, prepared by the Arvin GSA, Tejon-Castac Water District GSA
- Wheeler Ridge-Maricopa GSA

On March 2, 2023, the DWR deemed the six GSPs inadequate for the following deficiencies:

Deficiency 1: involved how the Plan established and justified undesirable results that represent effects caused by groundwater conditions occurring throughout the subbasin.

Deficiency 2: involved the establishment of minimum thresholds for the chronic lowering of groundwater levels.

Deficiency 3: involved the establishment of sustainable management criteria for land subsidence.

These findings are based on all uses of groundwater in the region and not specific to oil and gas production.

Under the SGMA, the Groundwater Authorities are required to begin implementation of the plans, although found inadequate, while working to amend the plans and address the deficiencies.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act authorizes regulation of California water rights and water quality by the State Water Resources Control Board (SWRCB). This act also established nine Regional Water Quality Control Board (RWQCBs) to ensure that water quality on local/regional levels is maintained. The project area is under the jurisdiction of the Central Valley RWQCB.

California Department of Water Resources California's Groundwater (Bulletin 118)

California's Groundwater (Bulletin 118) is the State's official publication on the occurrence and nature of groundwater in California. The publication defines the groundwater basin boundaries and summarizes groundwater information for each of the State's 10 hydrologic regions. *California's Groundwater* features current knowledge of groundwater resources, including information on the location, characteristics, use, management status, and conditions of the State's groundwater. The publication also presents findings and recommendations that support the future management and protection of groundwater.

Wastewater

Senate Bill 1281, Disclosure of Oil and Gas Water Use and Disposal

SB 1281, effective January 2015, amended Sections 3226.3 and 3227 of the Public Resources Code (PRC) to require that: (1) CalGEM provide the SWRCB with an annual "inventory of all unlined oil and gas field sumps" and (2) well operators provide CalGEM with quarterly information regarding the source and disposition of water produced by or used in oil and gas production in addition to existing obligations to report gas and oil production and produced water information on a monthly basis. The new quarterly reporting requirements include information regarding: (a) the source and volume of any water, including produced water (also subject to monthly reporting), including the water used to generate or make up the composition of any injected fluid or gas, identified by water source if more than one water source is used, (b) the volume of untreated water suitable for domestic or irrigation purposes used in oil and gas operations, (c) the treatment of water and the use of treated or recycled water in oil and gas field activities including, but not limited to, exploration, development, and production, and (d) the specific disposition of all water used in or generated by oil and gas field activities, including water produced from each well as reported in an operator's monthly reports, and separated by volume of disposition if more than one disposition method is used.

The amendments retain certain previous monthly reporting requirements in Section 3227, including: (1) the amount and gravity of oil, gas and water, and the number of days fluid was produced from each well, (2) the number of drilling, producing, injecting, or idle wells owned or operated by a person subject to reporting requirements, (3) the disposition of gas produced from each field, (4) the disposition of produced water each field and the amount of fluid or gas injected into each well used for enhanced recovery, underground storage of hydrocarbons, or wastewater disposal. In August 2015 the SWRCB stated in a letter to CalGEM (then, DOGGR) that for the purposes of reporting under Section 3227, "water suitable for domestic or irrigation purposes"

should be interpreted to mean water with a TDS concentration of 10,000 milligrams per liter or lower (CalGEM 2019).

Oil and Gas-Related Wastewater Disposal

Federal, state, and local laws, regulations, and policies pertaining to the disposal of oil and gas-related produced water and other wastewater in the project area are discussed in detail in Section 4.9, *Hydrology and Water Quality, Regulatory Setting*.

Solid Waste

California Department of Resources Recycling and Recovery (formerly California Integrated Waste Management Board)

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 the six agencies under the umbrella of the California Environmental Protection Agency. CalRecycle develops regulations to control and manage waste, for which enforcement authority is typically delegated to the local government. CalRecycle works jointly with local governments to implement regulations and fund programs.

California Integrated Waste Management Act (AB 939)

California adopted its first statewide, general recycling program in 1989. The Integrated Waste Management Act of 1989 (PRC 40050 et seq. or AB 939, codified in PRC 40000), administered by CalRecycle, requires all local and county governments to adopt a Source Reduction and Recycling Element to identify means of reducing the amount of solid waste sent to landfills. This law set reduction targets at 25 percent by the year 1995 and 50 percent by the year 2000.

Assembly Bill 341

AB 341 (Chesbro, Chapter 476, Statutes of 2011), approved by Governor Brown on October 5, 2011, established a new statewide goal of 75 percent recycling composting and source reduction by 2020. In contrast to earlier diversion mandates, disposal-related activities, including alternative daily cover, alternative intermediate cover, transformation, waste tire-derived fuel, and beneficial reuse at solid waste landfills, do not count toward the statewide recycling goal.

To achieve the 75 percent recycling goal, CalRecycle has identified six primary focus areas: (1) moving organics out of the landfill, (2) continuing reform of the Beverage Container Recycling Program; (3) expanding the recycling/manufacturing infrastructure; (4) exploring new models for state and local funding of materials management programs; (5) promoting state procurement of post-consumer recycled content products, and (6) promoting extended producer responsibility.

Electric Power, Natural Gas, and Telecommunications

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 Railroad Commission's regulatory authority to include natural gas, electric, telephone, and water companies as well as railroads and marine transportation companies. In 1946, the Railroad 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.

Local

Kern County General Plan

The Project Area is located within the Kern County General Plan (KCGP); therefore, would be subject to applicable policies and measures of the KCGP. The Land Use, Conservation, and Open Space Element and the Energy Element of the KCGP includes goals, policies, and implementation measures related to utilities and service systems that apply to the proposed Project, as described below.

Chapter 1. Land Use, Conservation, and Open Space Element

1.4. Public Facilities and Services

Goals

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.

Goal 9. Serve the needs of industries and Kern County residents in a manner that does not degrade the water supply and the environment and protect the public health and safety by avoiding surface and subsurface nuisances resulting from the disposal of hazardous wastes, irrespective of the geographic origin of the waste.

Policy 1. New discretionary development will be required to pay its proportional share of the local costs of infrastructure improvements required to service such development.

Policy 3. Individual projects will provide availability of public utility service as per approved guidelines of the serving utility.

Policy 15. Prior to approval of any discretionary permit, the County shall make the finding, based on information provided by the CEQA documents, staff analysis, and the applicant, that adequate public or private services and resources are available to serve the proposed development.

Implementation Measures

Implementation Measure C. Project developers shall coordinate with the local utility service providers to supply adequate public utility services.

Implementation Measure L. Prior to the approval of development projects, the County shall determine the need for fire protection services. New development in the County shall not be approved unless adequate fire protection facilities and resources can be provided.

Implementation Measure N. Secure complete and accurate information on all hazardous wastes generated, handled, stored, treated, transported, and disposed of within or through Kern County.

Implementation Measure O. Reduce to the greatest degree possible the amount of waste to be disposed of by encouraging private industry to construct and manage a high-quality system of transfer stations, recycling facilities, treatment plants, and incinerators located near the generators of hazardous waste.

Implementation Measure R. Roads and highways utilized for commercial shipping of hazardous waste destined for disposal will be designated as such pursuant to Vehicle Code Sections 31303 et seq. Permit applications shall identify commercial shipping routes they propose to utilize for particular waste streams.

1.8 Industrial

Policies

Policy 1. Locations for new industrial activities shall be provided with adequate infrastructure (water, sewage disposal systems, roads, drainage, etc.) to minimize effects on County services.

1.10 General Provisions

1.10.1 Public Services and Facilities

Policies

Policy 9: New development should pay its pro rata share of the local cost of expansions in services, facilities, and infrastructure which it generates and upon which it is dependent.

Policy 15: Prior to approval of any discretionary permit, the County shall make the finding, based on information provided by the California Environmental Quality Act (CEQA) documents, staff

analysis, and the applicant, that adequate public or private services and resources are available to serve the proposed development.

Policy 16: The developer shall assume full responsibility for costs incurred in service extension or improvements that are required to serve the project. Cost sharing or other forms of recovery shall be available when the service extensions or improvements have a specific quantifiable regional significance.

Implementation Measures

Implementation Measure C: Project developers shall coordinate with the local utility service providers to supply adequate public utility services.

Implementation Measure D: Involve utility providers in the land use and zoning review process.

Implementation Measure E: All new discretionary development projects shall be subject to the Standards for Sewage, Water Supply and Preservation of Environmental Health Rules and Regulations administered by the County's Public Health Services Department. Those projects having percolation rates of less than five minutes per inch shall provide a preliminary soils study and site specific documentation that characterize the quality of upper groundwater in the alternative septic systems would adversely impact groundwater quality. If the evaluation indicated that the uppermost groundwater at the proposed site already exceeds groundwater quality objectives of the RWQCBs or would if the alternative septic system is installed, the applicant would be required to supply sewage collection, treatment, and disposal facilities.

Amended Kern Groundwater Authority Groundwater Sustainability Plan

The KGA GSA prepared an Amended KGA GSP in 2022, to comply with the SGMA and serve as a comprehensive foundation for groundwater management within areas of the Kern County Subbasin covered by the KGA. The KGA's jurisdictional boundary is entirely within the subbasin, as defined in DWR Bulletin 118, south of the Tulare Lake Hydrologic Region of the San Joaquin Valley Groundwater Basin. The plan provides information on the current groundwater conditions, establishes the sustainability goals to be achieved through the implementation of management actions and projects, and demonstrates how sustainability will be achieved through the 20-year implementation period. On March 2, 2023, the DWR deemed the GSP inadequate for the following deficiencies:

Deficiency 1: involved how the Plan established and justified undesirable results that represent effects caused by groundwater conditions occurring throughout the subbasin.

Deficiency 2: involved the establishment of minimum thresholds for the chronic lowering of groundwater levels.

Deficiency 3: involved the establishment of sustainable management criteria for land subsidence.

These findings are based on all uses of groundwater in the region and not specific to oil and gas production.

Under the SGMA, the Groundwater Authorities are required to begin implementation of the plans, although found inadequate, while working to amend the plans and address the deficiencies.

Kern Integrated Regional Water Management Plan

The Kern Region published an Integrated Regional Water Management Plan update in 2020. The 2020 Tulare Lake Basin Portion of Kern County Integrated Regional Water Management (IRWM) Plan Update (2020 Plan Update) includes new information as required by the DWR 2016 Integrated Regional Water Management Proposition 1 Guidelines. IRWM is a collaborative effort to manage all aspects of water resources in a region. The State recognizes that there is a need to consider a broader range of resource management issues, competing water demands, new approaches to ensuring water supply reliability, and new ways of financing. The State's IRWM program was developed beginning with SB 1672, which created the Integrated Regional Water Management Act to encourage local agencies to work cooperatively to manage local and imported water supplies to improve water quality, quantity, and reliability.

Tulare Lake Basin Portion of Kern County Integrated Regional Water Management Plan

The Tulare Lake Basin Portion of Kern County Region, as defined for the purposes of this IRWMP, consists of that portion of the Tulare Lake Basin hydrologic region that is within Kern County, with small additional areas that are included for hydrologic reasons. The purpose of the IRWMP is to develop a cooperative regional framework, implementation plan, and context for managing water resources in the Kern region. Objectives detailed by the plan for the Kern region include to increase water supply, improve operational efficiency, improve water quality, promote land use planning and resource stewardship, and improve regional flood management.

West Kern Water District 2020 Urban Water Management Plan

The 2020 Urban Water Management Plan (UWMP) was prepared for WKWD in Kern County, California and describes the District's water supply, water demands, water reliability, and water conservation efforts. The document provides estimated population growth and water demands through the year 2045 and serves as a long-range planning document for the District.

The primary water facilities in the District include the following:

- 13 active groundwater wells (one inactive well)
- 26 above ground water storage tanks
- 15 booster pump stations
- 306 miles of distribution pipelines
- Recharge basins of approximately 415 acres
- Recharge basins in project vicinity of approximately 6,862 acres
- Recharge basins in Tule Elk reserve of approximately 729 acres

The District primarily pumps groundwater, but balances this extraction by recharging its SWP water and other supplemental water supplies. Water supply for WKWD is obtained from wells located in the northeast corner of the District in the underflow area of the Kern River Basin and from an area north and adjacent to the State of California's Tule Elk Reserve.

The District is within the Kern County Groundwater Subbasin. According to DWR, California Bulletin 118, the subbasin is in a water-short condition. The Kern Groundwater SubBasin was identified as being "critically overdrafted" by DWR. DWR also identified the subbasin as "High Priority" due to overdraft, land subsidence, and groundwater quality degradation. Similarly, the Kern Groundwater Subbasin has been designated by the SGMA as a high priority.

Kern County and Incorporated Cities Hazardous Waste Management Plan

In 1991, Kern County and the incorporated cities adopted the Kern County and Incorporated Cities Hazardous Waste Management Plan, which was developed to comply with State Law (California Health and Safety Code Section 25135 et seq.). The Hazardous Waste Management Plan includes goals, policies, and implementation measures directed at the safe and responsible management of hazardous waste, including waste stream management, source reduction, siting of new facilities, and other provisions. The safe management of hazardous waste is to be accomplished in accordance with federal, state, and local laws.

Kern County Integrated Waste Management Plan

The Kern County Public Works Department is required by the State to plan and implement waste management activities and programs in the County unincorporated area to assure compliance with AB 939 and subsequent State mandates. The Kern County Integrated Waste Management Plan includes a Reduction and Recycling Element, Household Hazardous Waste Element, and Non-disposal Facility Element. The Plan was approved February 1998 by the California Integrated Waste Management Board (now California Department of Resources Recycling and Recovery, or CalRecycle). The Kern County Integrated Waste Management Plan is the long-range planning document for landfill facilities.

Kern County Construction Waste Diversion Requirements per the California Green Building Code

As part of compliance with the State of California Green Building Code Requirements (known as CALGreen) that took effect beginning January 2011, Kern County implemented the following construction waste diversion requirements:

- Submittal of a Construction Waste Management Plan prior to project construction for approval by the Kern County Building Department;
- Recycling and/or reuse of a minimum 65 percent of C&D waste; and
- Recycling or reuse of 100 percent of tree stumps, rocks, and associated vegetation and soils resulting from land clearing.

Kern County Public Works Department Recycling Programs

The Waste Operations Division of the Kern County Public Works Department administers or sponsors the following recycling programs, which contribute toward meeting State-mandated solid waste diversion goals to achieve 75 percent recycling, composting, or source reduction of solid waste by 2020:

- Recycling programs at landfills to recycle or divert a wide variety of products, such as wood waste, cathode ray tubes, tires, inert materials, appliances, etc.
- Drop-off recycling centers for household recyclables. The County- and the city-operated drop-off recycling centers, which are located in the unincorporated metropolitan area and the city, may be used by both County and city residents
- Financial assistance for operation of the City of Bakersfield Green Waste Facility
- The Kern County Special Waste Facility for the disposal of household hazardous waste. Services are provided to all Kern County residents
- Semi-annual "bulky waste" collection events, which are held in the Bakersfield area and available to both County and city residents (co-sponsor)
- Christmas tree recycling campaign (participates jointly with the City of Bakersfield)
- Telephone book recycling program (co-sponsors with Community Clean Sweep)
- Community Clean Sweep summer workshops called "Trash to Treasure," which educate children about recycling and other Kern County Waste Management Department programs (sponsor)
- An innovative elementary school program called the "Clean Kids Hit the Road Puppet Show" (operates in collaboration with Community Clean Sweep)
- Recycling trailers for churches, schools, and nonprofit organizations

4.19.4 Impacts and Mitigation Measures

Methodology

Potential impacts to utilities and service systems associated with construction and operation of the project have been evaluated using a variety of resources, including multiple online sources and published documents, as well as the project specific WSA (Quad Knopf, Inc. 2023). The discussion below lists specific impacts and measures that would be incorporated to mitigate and reduce potential impacts, to the extent feasible.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist identify the following criteria, as established in Appendix G of the *CEQA Guidelines*, to determine if a project could potentially have a significant adverse effect on utilities and service systems.

A project could have a significant adverse effect on utilities and service systems if it would:

- 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;
- Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years;
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- 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; or
- Comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Project Impacts

Impact 4.19-1: 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

Construction

Water

The proposed project is not anticipated to result in a significant increase in water demand/use; however, water will be needed for dust suppression, fire protection, and pipeline hydrotesting. As indicated above, the source of this water will be from the Elk Hills water system, where water is provided by surface water that is banked underground and recovered as necessary. Impacts would be potentially significant without mitigation.

Wastewater Treatment

Construction of the project would generate a minimal volume of wastewater. During construction activity, wastewater contained within portable toilet facilities and hand washing facilities would be disposed of at an approved offsite disposal site. The Kern County Public Health Services Department Environmental Health Services Division is responsible for monitoring the use of portable toilet facilities, and the project proponent would be required to provide documentation of a portable toilet pumping contract. No off-site sewage or disposal connections to a municipal sewer system exist or are proposed. Therefore, construction of the project would not require or result in the relocation or construction of new or expanded wastewater treatment facilities, the construction

or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Stormwater Drainage

The project would be required to adhere to Kern County Public Works Department storm water requirements, which include measures to address stormwater controls on both management of runoff volume and water quality, including controlling erosion and protection of water quality of stormwater runoff. Additionally, in compliance with National Pollutant Discharge Elimination System (NPDES) General Construction Permit requirements, the proposed project would design and submit a site-specific Storm Water Pollution Prevention Plan (SWPPP) to minimize the discharge of stormwater during construction and a Water Quality Management Plan that include best management practices for runoff control, as described in Section 4.10, *Hydrology*.

Construction of the project would not exceed the capacity of existing storm water drainage systems in the area. Therefore, operation of the project is not anticipated to result in the relocation or construction of new or expanded stormwater drainage facilities, the construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Electric Power

Construction of the project would not displace existing electrical facilities. Diesel-fueled portable generators may be necessary to provide additional electricity demands for temporary on-site lighting, welding, and for supplying energy to areas of the sites where energy supply cannot be met via a hookup to the existing electricity grid. Therefore, as construction of the project would not require or result in the relocation or construction of new or expanded electric power facilities, the construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Natural Gas

The project would not use natural gas during the construction phase. Therefore, construction of the project would not require or result in the relocation or construction of new or expanded natural gas facilities, the construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Telecommunications

Installation of telecommunication equipment including underground and overhead telephone, fiber optics and wireless communications infrastructure such as cellular, satellite, or microwave towers are not proposed as a part of the project. Therefore, construction of the project would not require or result in the relocation or construction of new or expanded telecommunication facilities, the construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Operation

Water

Water to operate the carbon capture and storage (CCS) facilities is proposed to be sourced from produced water from existing oil and gas operations within Elk Hills. The proposed project's operational water demand would be 6.35 million gallons per year, or 0.37 percent of projected available regional water supply. The amount of water available is thus sufficient to meet the projected demand for the operation of the project. Therefore, operation of the project would not require or result in the relocation or construction of new or expanded water facilities, the construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Wastewater

The amine units proposed by the project will yield approximately 6,500 gallons of wastewater per day. The wastewater produced by the project will be transferred from the site location to the existing 27R wastewater facility, which handles approximately 4.32 million gallons per minute of wastewater. Therefore, operation of the project would not require or result in the relocation or construction of new or expanded wastewater treatment facilities, the construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Stormwater Drainage

The project would be required to adhere to Kern County Public Works Department stormwater requirements, which include measures to address stormwater controls on both management of runoff volume and water quality, including controlling erosion and protection of water quality of stormwater runoff. The proposed project would not exceed the capacity of existing storm water drainage systems in the area. Therefore, operation of the project would not result in the relocation or construction of new or expanded stormwater drainage facilities, the construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Electric Power

The project proposes to use the existing electricity grid, and project operations are not expected to significantly increase electricity consumption. Therefore, operation of the project would not require or result in the relocation or construction of new or expanded electric power facilities, the construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Natural Gas

The project proposes to send natural gas to the existing CGP-1 for further processing and component separation. It is used for pressure management, whereby natural gas is reinjected into the oil-bearing formation to maintain pressure in oil wells and improve Elk Hills oil production, and as a fuel source for the Elk Hills Power Plant. Therefore, operation of the project would not require or result in the relocation or construction of new or expanded natural gas facilities, the

construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Telecommunications

Installation of telecommunication equipment including underground and overhead telephone, fiber optics and wireless communications infrastructure such as cellular, satellite, or microwave towers are not proposed as a part of the project. Therefore, operation of the project would not require or result in the relocation or construction of new or expanded telecommunication facilities, the construction or relocation of which could cause significant environmental effects. Impacts would be less than significant.

Mitigation Measures

The improvements are analyzed as part of construction and operation of the proposed project and analyzed and mitigated for in Section 4.10, *Hydrology*.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.19-2: Have Sufficient Water Supplies Available to Serve the Project and Reasonably Foreseeable Future Development During Normal, Dry and Multiple Dry Years.

The sufficiency of the project water supply is analyzed on three bases: (1) the physical availability of the project area aquifer, and wells drilled therein, to provide groundwater in the amounts required for project construction and operation, (2) the estimates (in the 2020 WKWD UWMP) of normal water years, single-dry water years, and multiple-dry water years, water supply and demand-related water availability, and (3) the availability of groundwater for the project in compliance with SB610. (WSA, Appendix G-2).

The project water supply is proposed to be trucked to the project site from the Elk Hills water system, which is part of the WKWD. WKWD water is provided by pumped groundwater and imported surface water from the SWP that is banked underground and recovered as necessary. Based on the 2020 WKWD UWMP future water budget, approximately 18,600 (3,000 acre-feet per year for Elk Hills and 2,200 acre-feet per year for CRC) are expected to be available. The 2022 water usage for Elk Hills and CRC was 167.5 million gallons (514.1 acre-feet). With the Elk Hills and CRC allotment of 5,200 acre-feet year, only approximately 10 percent is being utilized. An additional demand of 75 acre-feet construction water demand would utilize 1.4 percent of the water allotment. The ongoing operational demand for the project is 19.49 acre-feet per year, or 0.37 percent of projected available supply, as shown in Table 4.19-2.

Table 4.19-2: Water Supply Availability

	Allotment (acre-feet per year)	Project Demand	Usage of Water Allotment
Elk Hills	3,000		
CRC	2,200		
Construction (18 months)		75 acre-feet	1.4%
Operation (per year)		19.49 acre-feet	0.37%
Total	**5,200**	**94.49 acre-feet**	**1.77%**

Key:
CRC = California Resources Corporation

The available information regarding the physical availability of groundwater at and near to the project site verifies that the groundwater aquifer and the well pumping history thereof are sufficient for both project construction and project operation. The WSA (Appendix G-2) concluded that a sufficient water supply is available and that the project water supply is in accord with California Water Code 10910, as amended in 2002 by the passage of SB 610's normal year/dry year/multiple-dry year requirements. Water supplies for the project would be sufficient to meet the projected project water demand. However, water supplies have the potential to be adversely affected if the project in the future demands more water than is available. The Kern County subbasin, as a whole, has an overdraft of 324,326 acre-feet per year over the baseline conditions of which the KGA is approximately 239,346 acre-feet of the deficit. Should the project require water supplies in excess of the allotment from the District, impacts to water supplies would be considered potentially significant. To address this, Mitigation Measure (MM) 4.19-1 would be implemented, ensuring that any groundwater or reclaimed water used is accounted for and regulated. Therefore, with mitigation, the project would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years and impacts would be less than significant.

Mitigation Measures

MM 4.19-1 Prior to issuance of a construction permit for any CCS project applicant, the owner/operator shall provide information on any groundwater or reclaimed water that will be used. Unmetered water wells cannot be used as a source of groundwater for the permit activity. Groundwater may only be used in a permitted activity from a water well equipped with a water meter. The Planning and Natural Resources Department shall compile the water use information in a report that shall be posted on the Kern County Planning and Natural Resources website for public use by December 31 of each calendar year. A copy shall be sent to all Groundwater Sustainability Agencies and the Kern County Water

Agency after being posted on the website. The information submitted on the permit shall include the following data:

- The source and estimated amount of any groundwater being used in the permit activity.
- Confirmation that any water well used in permit activity is metered.
- The source and estimated amount of any reclaimed water used in the permit activity.

Level of Significance

Impacts would be less than significant.

Impact 4.19-3: Result in a Determination by the Wastewater Treatment Provider Which Serves or May Serve the Project That It Has Adequate Capacity to Serve the Project's Projected Demand in Addition to the Provider's Existing Commitments

The project would not generate a significant amount of wastewater from operations. As discussed under Impact 4.19-1, wastewater generated by the project would be comingled with the produced water from existing operations in Elks Hills for disposal into one or more of the existing Class II water disposal wells within the field. Therefore, wastewater generated would be minimal and would be disposed of on-site. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.19-4: 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

Construction

During construction of the project, it is possible that generate solid waste in excess of state or local standards and infrastructure may be generated. However, it is anticipated the project would not generate substantial amounts of non-recyclable waste during construction. Materials will be recycled where feasible, with remaining disposal in landfills in compliance with all applicable regulations. In addition, materials brought to the project site would be used to construct facilities, and few residual materials are expected. Common construction waste may include metals, masonry, plastic pipe, rocks, dirt, cardboard, or green waste related to land development. Any hazardous

waste generated during construction would be disposed of at an approved facility. Due to the generation of a substantial amount of waste by the project, construction impacts of the project on existing landfills may be potentially significant without mitigation.

Non-hazardous construction refuse and solid waste would either be collected and recycled or disposed of at a local landfill. As discussed above, the project would likely be served primarily by the Taft Landfill approximately nine miles south of the project site. The Taft Landfill has a remaining capacity of 6,896,633 cubic yards with an anticipated closure year of 2076 (CalRecycle 2019). As noted above, this landfill accepts batteries, clean dirt, clean inerts (e.g., source separated asphalt, brick and concrete); C&D waste (e.g., asphalt, brick, concrete, dirt, and metal); dead animals; electronic waste; greenwaste; ordinary household trash; tires; treated wood waste; and used motor oil. MM 4.19-2 ensures that any solid waste produced by construction of the project is properly maintained as well as recycled where feasible, thus reducing the amount of waste transported to landfills. By complying with the landfill's regulations and restrictions and through implementation of MM 4.19-2, the solid waste generated by construction of the project would be maintained and impacts to landfills would be reduced to less than significant.

Operations

Drilling and production wastes would be non-hazardous. Most drilling and production wastes would be managed using one of the following methods (all of which require compliance with applicable laws and regulations):

- Underground injection, such as in disposal wells;
- Onsite burial, such as in pits, and landfills of non-hazardous drilling muds;
- Land treatment, such as by land spreading, land farming, and road spreading of non-hazardous oily dirt;
- Evaporation; and
- Discharge to evaporation and percolation ponds.

Other types of waste generated during operations may include wood, metal equipment parts, damaged tools, construction debris, excess soil and vegetation generated from cutting and grading, concrete residue, pallets, cardboard boxes, papers, plastics, banding materials, scrap steel, scrap aluminum, scrap wire, and general trash. These wastes are collected at specially permitted in-field solid waste transfer stations or disposed of in onsite permitted facilities, or transported to offsite landfills or recycling facilities, as appropriate, on a regular basis. Transfer stations consist of containers where waste is collected for transfer to Kern County landfills or other approved sites.

The California Solid Waste Reuse and Recycling Access Act of 1991, as amended, requires expanded or new development projects to incorporate storage areas for recycling bins into the project design. Reuse and recycling of construction debris would conserve landfill space.

During the operational phase of the project, it is possible for onsite processes to generate solid waste in excess of state or local standards and infrastructure if not properly regulated or maintained

on-site. The Taft Landfill is expected to serve the project through its operational phase. By complying with the landfill's regulations and restrictions, the solid waste produced by the project would be maintained and impacts related to landfill capacity would be less than significant.

Decommissioning

Wells would undergo plugging and abandonment once storage capacity targets have been met. Idle wells that are not yet plugged and abandoned would be maintained in compliance with CalGEM regulations. In decommissioning a formerly producing oil well, equipment such as pumping units, well cellars, facility pipelines, and other associated infrastructure would be disassembled and salvaged or appropriately disposed of. The same is valid for CO_2 injection and monitoring wells associated with geologic storage. Decommissioning of the wells is expected to generate solid waste, which has the potential to exceed state or local standards and infrastructure if not properly regulated and maintained. As discussed above, the Taft Landfill is expected to be in operation through 2076. By complying with the landfill's regulations and restrictions, along with implementation of MM4.19-2, impacts related to landfill capacity would be less than significant after mitigation.

Mitigation Measures

MM 4.19-2 During construction activities for Project facilities, the Applicant shall not store construction waste onsite for longer than the duration of the construction activity or transport any waste to any unpermitted facilities. The Applicant shall also reduce construction waste transported to landfills by recycling solid waste construction materials, such as taking materials to recycling and reuse locations listed in the brochure on recycling construction and demolition materials available on the Kern County Public Works Department, website.

Level of Significance After Mitigation

Impacts would be less than significant.

Impact 4.19-5: Comply With Federal, State, and Local Management and Reduction Statutes and Regulations Related to Solid Waste.

AB 341 requires Kern County to attain a waste diversion goal of 75 percent by 2020 through reduction, recycling, or composting. In addition, as part of compliance with CALGreen requirements, Kern County implements the following construction waste diversion requirements:

- Submittal of a Construction Waste Management Plan;
- Recycle and/or reuse a minimum 65 percent C&D waste; and
- Recycle or reuse 100 percent of tree stumps, rocks, and associated vegetation and soils resulting from land clearing.

During the construction, operational, and decommissioning phases of the project, it is possible for the project to generate solid waste that would be inconsistent with the reduction goals of federal,

state, and local management. Should the project not take action to comply with these statutes and regulations related to solid waste, the project may result in potentially significant impacts to solid waste. MM 4.19-2, as described above, would ensure that solid waste generated during construction of the project is maintained and reduced. Implementation of MM 4.19-2 along with compliance with applicable statutes and regulations will ensure compliance with policies to reduce waste sent to landfills, reducing impacts to less than significant.

Mitigation Measures

Implement MM 4.19-2, as described above.

Level of Significance After Mitigation

Impacts would be less than significant.

4.19.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Kern County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final Environmental Impact Report – Revisions to the Kern County Zoning Ordinance – 2015I Focused on Oil and Gas Local Permitting,* certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; an SREIR certified on March 8, 2021; and an Addendum adopted on August 23, 2020 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The documents provide a projection of future production in the entire oil field over 25 years of 3,649 new wells per year county wide of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, SB 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. CalGEM permitting for all wells

with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the Kern County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to utilities and service systems is Elk Hills. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects* of this EIR, would have on utilities and service systems. This geographic scope of analysis is appropriate because utilities and service resources within this area are expected to be similar to those in the project site because of their proximity; similar environments, landforms, and hydrology would result in similar land uses and project operations.

Impact 4.19-6: Cumulative Impacts on Utilities and Service Systems

With regard to impacts to utilities and service systems, the project has the potential to contribute significantly to cumulative impacts within the region. A complete analysis of the cumulative impacts of the various ground disturbing activities from oil and gas are provided in Chapter 4.17, *Utilities and Service Systems* of the Oil and Gas Final EIR. Through implementation of MM 4.19-1 and MM 4.19-2 water used and solid waste generated by the project would be regulated and maintained.

Stormwater Drainage

As described above, the project site is located in a region with no existing or planned stormwater infrastructure. There are no existing stormwater drainage systems on the project site, and no stormwater drainage infrastructure is proposed as part of the project. The project would be required to adhere to Kern County Public Works Department storm water requirements, which include measures to address stormwater controls on both management of runoff volume and water quality, including controlling erosion. Further, the hydrologic study and final drainage plan required by MM 4.10-2 would detail any necessary design features required to properly control stormwater runoff onsite. Cumulative projects would also be required to prepare a hydrologic study and final drainage plan that would help avoid substantial increases of stormwater generated onsite by their respective ground disturbance. Depending on the findings of their respective hydrologic studies and final drainage plans, these projects may need to construct stormwater control structures onsite to reduce the potential for increased stormwater runoff. Other projects in the vicinity would be required to offset substantial increases in stormwater as well per County requirements and would also be required to implement best management practices, as well as comply with the NPDES General Construction Permit and their respective SWPPP as applicable. Therefore, the project would not substantially contribute to a cumulative impact on stormwater drainage facilities.

Electric Power

Electricity is not expected to be consumed in large quantity during project construction, as construction equipment and vehicles are not electric (but rather diesel- or gas-powered). Temporary electricity may be required to provide as-necessary lighting and electric equipment; such electricity demand would be met by portable generator sets and, possibly, local distribution. The amount of

electricity used during construction would be minimal. Most on-site equipment (i.e., pumps, maintenance, monitoring, communications, etc.) would be powered by electricity from the on-site co-generation facility and supplemented by PG&E, as needed. As described in Section 4.6, *Energy,* the expected maximum electric load of the project is approximately 49 MW. As noted previously, Kern County consumed a total of 15,009 gigawatt hours of electricity in 2021 (1.71 gigawatts, or 1,710 MW). The project's electricity demand would constitute approximately 2.87 percent of the County's annual electricity demand. Other projects in the vicinity would be expected to provide their own analysis regarding their expected electricity usage. As the project proposes to contribute a minimal amount of the County's annual electricity demand, electricity use by the project would not be substantial enough to result in a cumulatively considerable impact to electric power. This project in combination with other cumulative projects would therefore not substantially contribute to a cumulative impact on electrical demand and facilities.

Natural Gas

No natural gas is proposed to be used in conjunction with the proposed project. Therefore, the project would not contribute to a cumulatively considerable impact related to natural gas demand and facilities.

Telecommunications

The project in combination with cumulative projects would increase demand on telecommunication facilities. However, demand associated with the project and other cumulative development would be minimal and is expected to be within the planning forecasts of the affected telecommunications provider. Therefore, cumulative impacts related to telecommunications facilities would be less than significant.

Water Supply

Several CCS and industrial projects are proposed within the groundwater basins in the region that would further impact the existing water supply, which is derived from the Kern County subbasin. The project and other cumulative projects would substantially decrease groundwater supplies. The project would obtain its water supply from the Elk Hills water system which is part of the WKWD. Though the WSA determined that there are sufficient supplies for both project construction and operation, MM 4.19-1 would be implemented to ensure that any groundwater or reclaimed water used is accounted for should the project require additional water supplies in excess of the allotment from the District. Other projects in the vicinity would be required to comply with similar water supply regulations.

The WKWD primarily pumps groundwater but balances this extraction by recharging its SWP water and other supplemental water supplies. Such banked water is not considered SWP water any longer once banked and can be used as a project source under CEQA. The WKWD is allocated 31,500 acre-feet per year of SWP surface water at 100 percent allocation when available. Based on the WKWD 2020 UWMP, the average water year supply is 18,600 acre-feet. According to the UWMP, when SWP water is restricted, the WKWD can meet water demand using banked groundwater supplies. Elk Hills and CRC are customers of WKWD. Elk Hills has an allocation

of 3,000 acre-feet per year while CRC has a 2,200 acre-feet per year allocation which could come from groundwater supplies since the source is dependent on the WKWD Board, not the applicant. As the basin is currently over drafted and the District's GSP has been deemed inadequate along with the other Kern subbasin plans where the other similar known and unknown projects could occur, the cumulative impacts of any use of groundwater in the area are considered significant and unavoidable after all feasible and reasonable mitigation.

Wastewater

The project is not expected to generate a significant amount of wastewater. Wastewater produced during construction (which is not disposed of via septic system) would be collected in portable toilet facilities and portable hand wishing facilities and disposed of at an approved facility. A septic system is not proposed to be installed as part of the project. Other planned projects may or may not propose facilities that would require the installation of a septic system. Depending on the facilities proposed to be built by these projects, other projects in the vicinity would be required to comply with applicable regulations and policies regarding the disposal of wastewater, thus minimizing impacts. Therefore, the project would not have the potential, when combined with impacts from past, present, or reasonably foreseeable projects, to result in a cumulative impact to a regional wastewater treatment facility or the capacity of said facilities.

Solid Waste

As described above, demolition and construction materials will be recycled where feasible, with remaining disposal in landfills in compliance with all applicable regulations. In addition, materials brought to the project site would be used to construct facilities, and few residual materials are expected. Non-hazardous construction refuse and solid waste would either be collected and recycled or disposed of at a local landfill. In addition, the project would generate a minimal amount of solid waste during operation and is not expected to significantly impact Kern County landfills. The Taft Landfill is expected to operate until 2076 and could accommodate solid waste generated during construction, operation, and decommissioning of the proposed project. However, generation of waste from cumulative projects could result in a cumulative impact. To ensure that the project reduces the amount of waste sent to landfills, implementation of MM 4.19-2 requires that any waste generated shall be recycled to the extent feasible. With implementation of MM 4.19-2, the project's incremental contribution would be less than cumulatively considerable. Furthermore, other cumulative projects would also be required to comply with State and local waste reduction policies.

Mitigation Measures

Implement MM 4.19-1 and MM 4.19-2.

Level of Significance After Mitigation

Cumulative impacts would be significant and unavoidable for groundwater supply (Impact 4.19-2).

Section 4.20

Wildfire

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Section 4.20
Wildfire

4.20.1 Introduction

This section of the Environmental Impact Report (EIR) describes the affected environment and regulatory setting for wildfire. It also describes the impacts on wildfire that would result from implementation of the California Resources Corporation's (project proponent) proposed Carbon TerraVault 1 (Kern County) Project (project). The project site is a specific set of parcels (see Chapter 3, *Project Description*) within the Elk Hills oilfield (Elk Hills), not the entirety of the field itself. Elk Hills is located 26 miles southwest of Bakersfield, approximately 8.5 miles from the city of Taft and approximately 4 miles from the unincorporated community of Buttonwillow.

The analysis in this section is based on the project plans, California Department of Forestry and Fire Protection (CAL FIRE), Kern County Fire Hazards Severity Zone (FHSZ) Maps, and the Biological Analysis Report (Quad Knopf 2023).

4.20.2 Environmental Setting

Site Characteristics and Fire Environment

The entirety of the project area lies within Elk Hills. The project area is characterized by heavy oil and gas exploration and production, including existing well pads, processing facilities, pipeline routes, and access roads. Development in the surrounding area is predominantly oil and gas production, agricultural, and municipalities such as the towns of McKittrick, Tupman, Taft, and Buttonwillow. The project area boundaries encompass a mix of parcels that have been owned and used for oil and gas production or on which leases have been acquired by the project proponent. The project site primarily consists of developed land and sparse desert vegetation. The CAL FIRE FHSZ maps are based on factors such as fuel, slope, and fire weather and are used to identify the degree of fire hazard throughout California (i.e., moderate, high, or very high). Although FHSZs do not predict when or where a wildfire could occur, they do identify areas where wildfire hazards could be more severe and therefore, are of greater concern. According to the CAL FIRE, Kern County FHSZ Maps, the project site is classified as a Local Responsibility Area (LRA) (CAL FIRE 2023a). The project site is not within a Federal Responsibility Area or State Responsibility Area (SRA). According to the 2007 CAL FIRE, Kern County FHSZ Maps for the LRAs, the project site is classified as LRA Moderate and Other Moderate. The area approximately 16 miles to the south of the project site is categorized as SRA Moderate. Moderate zones are typically wildland supporting areas of low fire frequency and relatively modest fire behavior.

Fire History

Fire history information can provide an understanding of fire frequency, fire type, most vulnerable project areas, and significant ignition sources. Fire history represented in this section uses CAL FIRE's Incident Maps that show fires back through 2016 (CAL FIRE 2023b) and CAL FIRE's Fire and Resource Assessment Program, Wildfire Perimeters by Decade Greater Than 5,000 Acres, 1950–2022 (CAL FIRE 2023c). Based on a review of these maps, no fires in the recorded history have burned across the project site.

Vegetation (Fuels)

Two habitat types, Valley saltbush scrub and urban, are present within the project area. The most prevalent habitat type within the project area is Valley saltbush scrub. The community is typically found on sandy to loamy soils without surface alkalinity, largely on rolling, dissected alluvial fans and is found in areas with long, arid summers and short, damp winters, and tule fog is often present during the winters. The structure of urban vegetation varies, with five types of vegetative structure defined: tree grove, street strip, shade tree/lawn, lawn, and shrub cover. Species composition in urban habitats varies with planting design and climate. Monoculture is commonly observed in tree groves and street tree strips. A description of the vegetation communities and land cover types is provided in the Biological Analysis Report (Appendix C-1).

4.20.3 Regulatory Setting

Federal

There are no federal wildfire regulations applicable to this proposed project.

State

2022 California Fire Code

The 2019 California fire code (Title 24, Part 9 of the California Code of Regulations) establishes regulations to safeguard against the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises. The fire code also establishes requirements intended to provide safety for and assistance to firefighters and emergency responders during emergency operations. The provisions of the fire code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure throughout California. Chapter 6 (Building Services and Systems) of the fire code focuses on building systems and services as they relate to potential safety hazards and when and how they should be installed. Building services and systems are addressed and include emergency and standby power systems, electrical equipment, wiring and hazards, and stationary storage battery systems. Chapter 33 (Fire Safety During Construction and Demolition) of the fire code outlines general fire safety precautions to maintain required levels of fire protection, limit fire spread, establish the appropriate operation of equipment and promote prompt response to fire emergencies. The fire code includes regulations regarding fire-resistance-

rated construction; fire protection systems, such as alarm and sprinkler systems (for inhabited structures); fire service features, such as fire apparatus access roads; means of egress; fire safety during construction and demolition; and wildland-urban interface areas.

2022 California Building Code, Chapter 7A

Chapter 7 of the 2022 California Building Code 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 state as a "Fire Hazard Severity Zone," in accordance with the Public Resources Code 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. The building code details the materials, systems, and assemblies used for structural fire resistance and fire-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings.

Public Resources Code 4291–4299

California Public Resources Code Section 4291-4299 et seq. requires that brush, flammable vegetation, or combustible growth within 100 feet of buildings be maintained. Vegetation that is more than 30 feet from the building, less than 18 inches high, and important for soil stability, may be maintained; as may single specimens of trees or other vegetation that is maintained so as to manage fuels and not form a means of rapid fire transmission from other nearby vegetation to a structure. Additionally, the Public Resources Code outlines infraction fees, certification, and compliance procedures applicable with state and local building standards, including those described in subdivision (b) of Section 51189 of the Government Code.

Local

Kern County General Plan

The project site is located within the Kern County General Plan (KCGP) area; therefore, it is subject to applicable policies and measures of the KCGP. The Safety Element of the KCGP include goals, policies, and implementation measures related to wildfire that apply to the project, as described below.

Chapter 4. Safety Element

4.6. Wildland and Urban Fire

Policies

Policy 1. Require discretionary projects to assess impacts on emergency services and facilities.

Policy 4. Ensure that new development of properties have sufficient access for emergency vehicles and for the evacuation of residents.

Policy 6. All discretionary projects shall comply with the adopted Fire Code and the requirements of the Fire Department.

Implementation Measure

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.

Kern County Specific Plans

Kern County (County) has adopted 24 Specific Plans. These Specific Plans amplify the goals and policies of the KCGP and are, therefore, consistent with them. The project site is not located wholly or partially within any adopted Specific Plan areas.

Kern County Fire Code

Chapter 17.32 of the Kern County Municipal Code details the Kern County Fire Code, which is an adoption of the 2022 California Fire Code with some amendments. The purpose of the County's fire code is to regulate the safeguarding of life, property, and public welfare to a reasonable degree from the hazards of fire, hazardous materials release, or explosion due to handling of dangerous and hazardous materials; conditions hazardous to life or property in the occupancy and use of buildings and premises; the operation, installation, construction, and location of attendant equipment; the installation and maintenance of adequate means of egress; and providing for the issuance of permits and collection of fees.

Kern County Fire Department Strategic Fire Plan

The Kern County Fire Department Strategic Fire Plan, adopted in 2021, assesses the wildland fire situation throughout the SRA within the County. The plan includes stakeholder contributions and priorities and identifies strategic targets for pre-fire solutions as defined by the people who live and work within the local fire area. The plan provides for a comprehensive analysis of fire hazards, assets at risk, and level of services to systematically assess the existing levels of wildland protection services and identifies high-risk and high-value areas that are potential locations for costly and damaging wildfires. Additionally, the plan provides an annual report of unit accomplishments. The plan gives an overview of Kern County Fire Department Battalions and ranks these areas in terms of priority needs as well as identifies the areas of SRA. According to the plan, 69 percent of county areas are within an SRA. The county is broken up into seven different fuel management areas: Tehachapi, Western Kern, Northern Kern, Mt. Pinos Communities, Kern River Valley, Foothill, and Valley. The project site is located within Battalion 6 (Valley) (KCFD 2021).

4.20.4 Impacts and Mitigation Measures

Methodology

Wildfire impacts are considered on the basis of (1) off-site wildland fires that could result due to the proposed project, and (2) on-site generated combustion that could affect surrounding areas. The project's potential impacts associated with wildfires have been evaluated using a variety of resources, including CAL FIRE maps showing FHSZs, CAL FIRE's Fire and Resource Assessment Program, and fire history and vegetation data from the Biological Analysis Report (Quad Knopf 2023), project location maps, and project characteristics. Using the aforementioned resources and professional judgment, impacts were analyzed according to the California Environmental Quality Act (CEQA) significance criteria described below.

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist identify the following criteria, as established in Appendix G of the CEQA Guidelines, to determine whether a project could potentially have a significant impact with respect to wildfires. A project would have a significant impact with respect to wildfires if it would be located in or near SRAs or lands classified as very high fire hazard severity zones, and if that project would:

- Substantially impair an adopted emergency response plan or emergency evacuation plan.
- Exacerbate wildfire risks, due to slope, prevailing winds, or other factors, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.
- 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.
- 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.

Project Impacts

Impact 4.20-1: Substantially Impair an Adopted Emergency Response Plan or Emergency Evacuation Plan.

The project site is not classified as being within a high fire hazard severity zone and is not anticipated to physically impede the existing emergency response plans, emergency vehicle access, or personnel access to the site. The site is located in a rural area with limited population, primarily developed with oil and gas production facilities and agricultural land. The project site is not located along an identified emergency evacuation route and is not identified in any adopted emergency evacuation plan. Also, in compliance with applicable fire code and building code requirements, construction managers and personnel would be trained in fire prevention and

emergency response. Fire suppression equipment specific to construction would be maintained on site. Additionally, project construction would comply with applicable existing codes and ordinances related to the maintenance of mechanical equipment, handling and storage of flammable materials, and cleanup of spills of flammable materials. Therefore, the project would not conflict with the implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan and impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.20-2: 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

Slope and wind speed can influence the spread of fires. Upslope topography eventually increases the spread rate of the fire in all fuel beds over flat conditions (Linn et al. 2010). Elevations across the project site range from 750 to 1,550 feet above mean sea level. The topography of the project area consists of variable terrain from gentle slopes to steep hill slopes. Once completed, the project would include five full-time employees, who would operate the facility seven days a week, 24 hours a day. An additional five full-time employees could be on site at any time, should repairs or other maintenance work be required. Furthermore, as described above, the project site is classified as LRA Moderate; the entirety of the project site is outside of areas identified by CAL FIRE as having substantial or very high risk. Thus, the potential for wildfire on the project site is considered low. Additionally, project construction would comply with applicable existing codes and ordinances related to the maintenance of mechanical equipment, handling and storage of flammable materials, and cleanup of spills of flammable materials. Given the moderate potential for fire and the lack of permanent occupants, the project is not anticipated to expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire due to slope, prevailing winds and other factors. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Level of Significance

Impacts would be less than significant.

Impact 4.20-3: 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

The project includes establishing and using a temporary construction corridor and temporary storage and laydown areas. The temporary construction corridor right-of-way, of up to approximately 12 feet in width, would be established along areas of the pipeline route not accessible via established roads or other existing cleared areas to allow for off-road construction equipment and a travel path. Construction of the project would include improvements to existing access roads to the project site, the dirt access roads to the proposed turbine locations, and construction of turbine and crane pads. Other construction-related tasks would include the creation of temporary roadways and equipment laydown sites that are not required as part of the ongoing operation of the facility would be reclaimed. Such roads and laydown areas would be restored to their previous condition through hydroseeding. All roads would comply with development requirements for emergency access; therefore, would not exacerbate fire risk that could result in temporary or ongoing impacts to the environment.

Most fires in the dry valley areas and foothills are caused by lightning or vehicles. The installation of electrical systems proposed as part of the project would not be placed within a high fire hazard zone, and the vegetation would be cleared; therefore, the proposed project would not result in increased fire risks that could result in temporary or ongoing impacts to the environment. Additionally, as discussed in Section 4.9 *Hazards and Hazardous Materials*, the Owner/operator shall develop and implement an emergency response plan that contains notification procedures and emergency fire precautions consistent with the California Fire Code and Kern County Fire Code for use during construction, operation, and decommissioning (see Mitigation Measure [MM] 4.9-18 and MM 4.9-19). The Owner/operator shall also restrict the use of chainsaws, chippers, grinders, and torches. If such equipment is required, the site should be equipped with portable or fixed fire extinguishers and/or a water tank (see MM 4.9-20). Implementation of this plan minimizing use of equipment would ensure that potential impacts related to installation or maintenance of associated infrastructure is reduced; therefore, impacts would be less than significant.

Mitigation Measures

Implement MM 4.9-18 through MM 4.9-20, found in Section 4.9, *Hazards and Hazardous Materials*.

Level of Significance after Mitigation

Impacts would be less than significant.

Impact 4.20-4: 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

No alterations to existing on-site drainage patterns are proposed as part of the project. Additionally, the project would require implementation of a stormwater pollution prevention plan, which would include erosion and sediment control best management practices during construction, thereby reducing the potential of erosion and siltation during construction and controlling potential flooding events that could occur during construction. The project proposes the construction of facility pipelines, capture facilities, new injection and monitoring wells, and workover wells. As discussed in Section 4.10, *Hydrology and Water Quality*, the County requires development of a drainage plan with the site development grading permit, which would manage stormwater and reduce the risk for off-site impacts due to erosion and impacts on water quality, as implemented by MM 4.10-1. Implementation of a drainage plan would minimize potential increases in runoff and ensure that design measures are implemented to minimize erosion, sedimentation, and flooding on site and off site.

The majority of on-site soil types have high infiltration rates and low runoff potential. The southern Sierra Nevada foothills are east of the project, while the Temblor Range of the Southern Coast Range lies to the west. The topography of the project area consists of variable terrain from gentle slopes to steep hill slopes. Based on the fire history immediately surrounding the site, moderate zone designation, soil types, and surface hydrology, there is a low potential for the project site to be at risk of post-fire slope instability or drainage changes. Although the project would introduce new structures to the project site, the structures would not be placed in a highly flammable landscape. Therefore, the project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. Impacts would be less than significant.

Mitigation Measures

Implement MM 4.10-1 found in Section 4.10, *Hydrology and Water Quality*.

Level of Significance after Mitigation

Impacts would be less than significant.

4.20.5 Cumulative Setting, Impacts, and Mitigation Measures

Cumulative Setting

Due to the proposed project's location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. The County has prepared an EIR evaluating the potential impacts (including contributions to cumulative impacts) of oil and gas development in connection with previously proposed amendments to the Kern County Zoning Ordinance: *Final*

Environmental Impact Report - Revisions to the Kern County Zoning Ordinance - 2015(C) Focused on Oil and Gas Local Permitting, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018; a Supplemental Recirculated EIR (SREIR) certified on March 8, 2021; and an addendum adopted on August 23, 2022 (collectively referred to as the "Oil and Gas EIR"). The Oil and Gas EIR is referenced in this EIR as a source of information regarding cumulative impacts from oil and gas development that were not disputed in the most recent litigation before the Court of Appeal. However, this EIR does not rely on the Oil and Gas EIR for purposes of tiered review under CEQA (Guidelines Section 15152). The information in these documents provides evidence for the record of the analysis of cumulative impacts of the disturbance, construction activities, and operation of the wells and abandonment activities as projected in the Oil and Gas EIR.

The aforementioned documents provide a projection of future production in the entire oilfield over 25 years of 3,649 new wells countywide per year of various types (production, water disposal, water flood injectors, idle wells, non-cyclic, observation wells, steam flood injectors, air injection and gas disposal) (pages 3-37 and 3-38 SREIR 2020/2021) and an additional 5,066 other wells (cyclic wells, Senate Bill [SB] 4 Activities, plugged and abandoned) per year (page 3-38 SREIR 2020/2021). The 25-year span from 2015 to 2040 has run for 8 years. In the County permitting years (2016, 2017, 2018, 2019, 2020, 2021, and 2022), the average number of permits in all categories has been 1,600 permits per year. In addition, the State of California regulatory authorities stopped issuing any SB 4 permits (projected to be 1,200 per year) since February 2021. The California Department of Conservation Geologic Energy Management Division permitting for all wells with the exception of plugging and abandonments has never averaged over 2,000 permits a year (as implementation in some years of the County permits) since 2019. The analysis in the documents is, therefore, a very conservative impact review of cumulative impacts.

The geographic scope for cumulative impacts to wildfire is Elk Hills. Analysis of cumulative impacts takes into consideration the entirety of impacts that the projects, zone changes, and general plan amendments discussed in Section 3.9, *Cumulative Projects*, would have on wildfire. This geographic scope of analysis is appropriate because wildfire impacts within this area are expected to be similar to those in the project site because of their proximity; similar environments, landforms, and hydrology would result in similar land use and site types.

Impact 4.20-5: Contribute to Cumulative Wildfire Impacts

With regard to impacts to wildfire, the project has the potential to contribute significantly to cumulative impacts within the region. A complete analysis of the various ground disturbing activities from oil and gas is provided in Section 4.20, *Wildfire* (2015 FEIR). Through implementation of MM 4.9-18 through MM 4.9-20, and MM 4.10-1, direct impacts to wildfire would be reduced to less than significant.

With regard to impairment of an adopted emergency response plan or emergency evacuation plan, all of the related projects would be required to provide adequate emergency access in accordance with County fire and building code requirements (or similar codes/requirements in accordance with the applicable jurisdiction within Los Angeles County) and prior to the issuance of a building

permit. As previously discussed, the project site is not classified as being within a high fire hazard severity zone, is not located along an identified emergency evacuation route or within an adopted emergency evacuation plan, and would comply with fire code and building code requirements including fire prevention and emergency response training for site personnel. As concluded in the discussion of project impacts above, the project would have a less than significant impact related to impairment of an adopted emergency response or evacuation plan. Similar to the project, related projects would be required to determine whether they are classified as being within a high fire hazard severity zone, identified within an emergency evacuation route or within an adopted emergency evacuation plan, and whether they meet the requirements of applicable fire code and building code. Therefore, the project and related projects are expected to result in a less than significant cumulative impact to an adopted emergency response plan or emergency evacuation plan.

Regarding cumulative impacts related to exposure of project occupants to pollutant concentrations from a wildfire, while the proposed project is not within SRAs or high fire hazard severity zones, some related projects in the area may be. Similar to the proposed project, all related projects would be required to implement building and landscape design features in accordance with the fire code and building code to reduce wildfire risk and exposure of occupants to pollutant concentrations from a wildfire. Adherence to the fire code and building code requirements would minimize potential impacts related to exposure to and the uncontrolled spread of a wildfire. As concluded in the discussion of project impacts above, the project would have a less than significant impact related to exposure of project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Therefore, the project and related projects are expected to result in a less than significant cumulative impact related to exposure of project occupants to pollutant concentrations from a wildfire.

Related projects may require associated infrastructure such as roads, fuel breaks, and power lines that could exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. The County would review these projects for land use and zoning consistency and compliance with applicable requirements and analyze them for environmental impacts. The placement of infrastructure would adhere to all fire codes to minimize the potential fire risk such as siting and design. The project includes establishing and utilizing a temporary construction corridor and temporary storage and laydown areas. MM 4.9-18 would be implemented to ensure that an emergency response plan, which contains notification procedures and emergency fire precautions, is prepared. Therefore, the project and related projects are expected to result in a less than significant cumulative impact related to the installation or maintenance of associated infrastructure.

Some related projects could be proposed in areas that could expose people or structures to risks from downslope or downstream flooding or landslides as a result of post-fire slope instability. Based on the recent fire events in California, all projects would be required to adhere to the County's zoning and land use designations and codes (or those of the applicable jurisdiction within Los Angeles County), state and local fire codes, and regulations associated with drainage and site stability. These regulations, policies, and codes would reduce the potential for exposing people or structures to risks from downslope or downstream flooding or landslides as a result of post-fire

slope instability. Each project would require site-specific hydrology and drainage studies for effective drainage design. As concluded in the discussion of project impacts above, with the implementation of MM 4.10-1, the project would not expose people or structures to significant risks due to post-fire slope instability or drainage changes and would have a less than significant impact. Therefore, the project and related projects are expected to result in a less than significant cumulative impact related to exposing people or structures to significant risks as a result of runoff, post-fire slope instability, or drainage changes.

Mitigation Measures

Implementation of MM 4.9-18, MM 4.9-19, MM 4.9-20, and MM 4.10-1.

Level of Significance after Mitigation

Cumulative impacts would be less than significant.

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Chapter 5

Consequences of Project Implementation

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Chapter 5

Consequences of Project Implementation

5.1 Environmental Effects Found to Be Less Than Significant

According to Section 15128 of the California Environmental Quality Act (CEQA) Guidelines, an Environmental Impact Report (EIR) must "contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR."

This contents of this EIR for the proposed Carbon TerraVault I Project (project) were established based on the Notice of Preparation/Initial Study (NOP/IS) located in Appendix A. Based on the findings of the NOP/IS and the results of scoping, Kern County has determined that this EIR must include a detailed analysis of all environmental issues identified in Appendix G of the CEQA Guidelines. This analysis is included in Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*, of this EIR.

After further study and environmental review, as documented in this EIR, direct, indirect, and cumulative impacts of the project would be less than significant or could be reduced to less than significant levels with mitigation measures for the following issue areas:

- Hazards and Hazardous Materials
- Hydrology and Water Quality (all issues – except groundwater)
- Land Use and Planning
- Population and Housing
- Public Services
- Recreation
- Transportation and Traffic
- Tribal Cultural Resources
- Utilities and Service Systems (all issues – except water supply)

5.2 Significant Environmental Effects That Cannot Be Avoided

Section 15126.2(b) of the CEQA Guidelines requires EIRs to describe any significant impacts, including those that can be mitigated but not reduced to less than significant levels. Potential environmental effects of the proposed Project and proposed mitigation measures are discussed in detail in Chapter 4 of this EIR.

As shown in Table 5-1, impacts in the following areas would be significant and unavoidable, even with the incorporation of feasible mitigation measures.

Table 5-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
Aesthetics	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on aesthetic and visual resources. Even with mitigation, the project has the potential to contribute to cumulative impacts within the region with the additions of the injection wells, monitoring wells, and capture facilities equipment. The cumulative impacts of the project when combined with other known and unknown projects are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Agricultural Resources	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on agricultural resources. Due to the importance of the region's agricultural resources, the potential impacts related to the project's incremental contribution to the cumulative farmland conversion would be considered cumulatively considerable. The cumulative impacts of the project when combined with other known and unknown projects are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.

Table 5-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
Air Quality	The project's total emissions would exceed the San Joaquin Valley Air Pollution Control District thresholds for NO_X, PM_{10}, and $PM_{2.5}$, for which the project region is nonattainment under an applicable federal or State ambient air quality standard. With the implementation of MM 4.3-1 and MM 4.3-8, the impact would remain **significant and unavoidable.**	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on air quality resources. Because the project's specific emissions would contribute to Kern County's 2020 emissions inventory and to the 2025 projected emissions of Kern County, the project's incremental effects on air quality would be cumulatively considerable and, even with mitigation, this potentially significant cumulative impact would be **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Biological Resources	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on biological resources. Although the cumulative impacts from CCS projects will be less due to the CCS Surface Land Use restrictions, other clean energy projects that are sited in the valley portion of Kern County have the potential to impact species and reduce habitats. The cumulative impacts of the project when combined with other known and unknown projects are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Cultural Resources	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on cultural resources. Regarding the potential to disturb human remains, the project could contribute significantly to cumulative impacts within the region. Although no human remains have been identified within the project site, to date, there is potential for their discovery during project construction. The cumulative impacts of the project when combined with other known and unknown projects are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation

Table 5-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
		measures have been evaluated and included.
Energy	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on energy resources. The cumulative impacts on the regional grid, which have not been determined to meet the CARB 2045 goals for production, are **cumulatively significant and unavoidable** after all feasible and reasonable mitigation.
Geology and Soils	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on geologic resources. Due to the uncertainty of the implementation of multiple projects and the ability to simultaneously cease injection during a seismic event, the impacts from cumulative induced seismic activity from this project plus any future permitted CCS project are **cumulatively significant and unavoidable**. All reasonable and feasible mitigation measures have been evaluated and included.
Greenhouse Gases	The project has the potential to generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment and conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. With the implementation of MM 4.8-1 and MM 4.8-2, the impact would remain **significant and unavoidable.**	The geographic scope for cumulative impacts for GHGs for the project is the Elk Hills oilfield. Climate change impacts are inherently global and cumulative, and not project specific. While implementation of MM 4.8-1 and MM 4.8-2 would encourage reduction in GHG emissions at a regional level, they do not provide a mechanism that guarantees GHG emission reductions on a cumulative basis. The project's cumulative contribution to GHG emissions after implementation of the recommended mitigation measures would remain **cumulatively significant and unavoidable**.

Table 5-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
Hydrology and Water Quality	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on groundwater supply. As the Kern County subbasin is currently over drafted and the West Kern Water District's Groundwater Sustainability Plan has been deemed inadequate, along with the other Kern subbasin plans where the other similar known and unknown projects could occur, the cumulative impacts of any use of groundwater in the area are considered **cumulatively significant and unavoidable** after all feasible and reasonable mitigation.
Mineral Resources	The project could 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. Although MM 4.12-1 would require the owner/operator to annually document the potential loss of oil, the loss of oil reservoir in the project area is considered a significant loss of oil, which is considered a mineral of value to the State. With the implementation of MM 4.12-1, impacts would remain **significant and unavoidable**.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on mineral resources. The loss of oil reservoir as part of the project is considered a significant loss of mineral resources. With the implementation of MM 4.12-1, impacts would remain **significant and unavoidable**.
Noise	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative noise impacts. Since oil and gas activities could occur anywhere in the project area, the combined noise levels from the proposed project and existing or reasonably foreseeable projects depend on the proximity of oil and gas activities to other noise sources at a specific location. Noise generated from construction of wells authorized under the project, conservatively assuming use of the largest exploratory deep drilling rig (Kenai Rig), could be in excess of 65 dBA CNEL up to 4,000 feet from a construction site. Therefore, significant noise impacts would occur if there are sensitive noise receptors within 4,000 feet of the construction of a well. Other projects with construction or operations

Table 5-1: Summary of Significant and Unavoidable Impacts of the Project

Resources	Project Impacts	Cumulative Impacts
		occurring concurrently with construction or operations of a well would also contribute to noise levels experienced by nearby sensitive noise receptors. Although the project's cumulative contribution to noise is minor, cumulative impacts remain **significant and unavoidable**.
Utilities and Service Systems	There would be no significant and unavoidable project impacts.	The project, in combination with other existing or reasonably foreseeable projects, could result in cumulative impacts on utilities and service systems in regard to groundwater supply. As the Kern County subbasin is currently over drafted and the West Kern Water District's Groundwater Sustainability Plan has been deemed inadequate, along with the other Kern subbasin plans where the other similar known and unknown projects could occur, the cumulative impacts of any use of groundwater in the area are considered **cumulatively significant and unavoidable** after all feasible and reasonable mitigation.

Key:
CARB = California Air Resources Board
CCS = carbon capture and storage
CNEL = community noise equivalent level
dBA = A-weighted decibels
GHG = greenhouse gas
MM = mitigation measure
NO_X = oxides of nitrogen
State = State of California

5.3 Irreversible Impacts

Section 15126.2(c) of the CEQA Guidelines defines an irreversible impact as an impact that uses nonrenewable resources during the initial and continued phases of the project. Irreversible impacts can also result from damage caused by environmental accidents associated with a project. Irretrievable commitments of resources should be evaluated to ensure that such consumption is justified.

Build-out of the project would commit nonrenewable resources during project construction. During project operations, oil, gas, and other fossil fuels and nonrenewable resources would be consumed, primarily in the form of transportation fuel for project employees. Therefore, an irreversible

commitment of nonrenewable resources would occur as a result of long-term project operations. However, assuming that those commitments occur in accordance with the adopted goals, policies, and implementation measures of the Kern County General Plan (KCGP), as a matter of public policy, those commitments have been determined to be acceptable. The KCGP ensures that any irreversible environmental changes associated with those commitments will be minimized, to the extent feasible.

5.4 Significant Cumulative Impacts

According to Section 15355 of the CEQA Guidelines, the term cumulative impacts "refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Individual effects that may contribute to a cumulative impact may result from a single project or a number of separate projects. Individually, the impacts of a project may be relatively minor, but when considered along with impacts of other closely related or nearby projects, including newly proposed projects, the effects could be cumulatively considerable.

This EIR considers the potential cumulative effects of the proposed project. Impacts for the following issue areas have been found to be cumulatively considerable:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gases
- Hydrology and Water Quality (groundwater supply)
- Mineral Resources
- Noise
- Utilities and Service Systems (water supply)

Each of these significant cumulative impacts is discussed in the applicable section of Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*, of this EIR.

5.5 Growth Inducement

The KCGP recognizes that certain forms of growth are beneficial, both economically and socially. Section 15126.2(d) of the CEQA Guidelines provides the following guidance on growth-inducing impacts: a project is identified as growth inducing if it "could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment."

Growth inducement can be a result of new development that requires an increase in employment levels, removes barriers to development, or provides resources that lead to secondary growth. With respect to employment, the project would not induce substantial growth. Construction staff that are not local would likely be housed in existing communities. Project operation would include five regular full-time employees, and an additional five full-time employees could be on site at any time if repairs or other maintenance work is required. It is expected that some of these individuals would already reside in the area and operation of the project would not result in a substantial influx of people (such as a new residential development, school, or other use that would result in large volumes of people residing near or traveling to the project site). Therefore, the project is not likely to induce any growth within Kern County.

5.6 Energy Conservation

To ensure that energy implications are considered in project decisions, CEQA requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy (see Public Resources Code section 21100(b)(3)). According to Appendix F of the CEQA Guidelines, the goal of conserving energy implies the wise and efficient use of energy, including: (1) decreasing overall per capita energy consumption; (2) decreasing reliance on natural gas and oil; and (3) increasing reliance on renewable energy sources.

As discussed in Section 4.6, *Energy*, during construction of the project, energy resources would be consumed in the form of diesel and gasoline fuel from the use of off-road equipment and on-road vehicles. Temporary electricity may be required to provide as-necessary lighting and electric equipment. The amount of electricity used during construction would be minimal. Natural gas is not anticipated to be required during construction of the project. Overall, construction activities associated with the proposed project would result in the consumption of petroleum-based fuels. However, there are no unusual project characteristics that would necessitate the use of construction equipment or vehicles that would be less energy efficient than at comparable construction sites in other parts of the State of California (State). Therefore, it is expected that construction fuel consumption associated with the proposed project would not be any more inefficient, wasteful, or unnecessary than at other construction sites in the region.

During operation, most on-site equipment (i.e., pumps, maintenance, monitoring, communications, etc.) for the pre-combustion oilfield gas would be powered by electricity from the Elk Hills Power

Plant and supplemented by Pacific Gas Electric, as needed. Although the project would result in increased demand for energy resources, the energy would be consumed efficiently and would be typical of the current state of industrial carbon capture projects. Projections of energy use described in Section 4.6, *Energy*, for the total electricity needed for the project, are based on the current technology (amine) and do not represent the newer forms of carbon capture, which include conservation measures to reduce the electric demand. Therefore, the projections are conservative and will be lower when other sources are permitted for injection into the project. As the State phases out oilfield extraction and related gas, and replaces gas power plants and fossil fuel industry sources with newer carbon capture facilities and renewable energy sources such as solar (required for many forms of financing), the project would meet the requirements of Appendix F of the CEQA Guidelines.

Based on this analysis, the project would consume energy resources during construction and operations. Implementation of the project would support industrial operations that use renewable energy, decrease reliance on fossil fuels, including natural gas, and become more efficient in the use of electricity. The State's policies outlined in Senate Bill 905, and the ban on enhanced oil recovery with CO_2, ensures that the goals of Appendix F in sources for the injection will be more efficient.

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Chapter 6

Alternatives

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Chapter 6
Alternatives

6.1 Introduction

The California Environmental Quality Act (CEQA) requires that an Environmental Impact Report (EIR) describe a range of reasonable alternatives to the project or to the location of the project site that could feasibly avoid or lessen any significant environmental impacts of the project while attaining most of the project's basic objectives. An EIR also must compare and evaluate the environmental effects and comparative merits of the alternatives. This chapter describes alternatives considered but eliminated from further consideration, including the reasons for elimination, and compares the environmental impacts of several alternatives retained with those of the Carbon TerraVault I Project (project).

The following are key provisions of the CEQA Guidelines (Section 15126.6):

- The discussion of alternatives shall focus on alternatives to the project or its location that 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.
- The No Project Alternative shall be evaluated, along with its impacts. The No Project analysis shall discuss the existing conditions at the time the notice of preparation was published, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.
- The range of alternatives required in an EIR is governed by a "rule of reason;" therefore, the EIR must evaluate 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.
- For alternative locations, only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR.
- An EIR need not consider an alternative whose effects cannot be reasonably ascertained and whose implementation is remote and speculative.

The range of feasible alternatives is selected and discussed in a manner to foster meaningful public participation and informed decision making. Among the factors that may be taken into account when addressing the feasibility of alternatives, as described in Section 15126.6(f)(1) of the CEQA Guidelines, are environmental impacts, site suitability, economic viability, availability of infrastructure, general plan consistency, regulatory limitations, jurisdictional boundaries, and whether the project proponent could reasonably acquire, control, or otherwise have access to an

alternative site. An EIR need not consider an alternative whose effects could not be reasonably identified, whose implementation is remote or speculative, and that would not achieve the basic project objectives.

Per the CEQA Guidelines, this section discusses alternatives that are capable of avoiding or substantially lessening the project's potentially significant environmental effects. Section 6.2, *Summary of Project Impacts Relevant to Evaluation of Alternatives*, summarizes the significant project impacts relevant to this EIR's evaluation of project alternatives. Following this summary, Section 6.3, *Project Objectives*, restates California Resources Corporation's (project proponent's) project objectives. Section 6.4, *Process Used to Develop/Screen Alternatives* summarizes the process used to screen alternatives. Section 6.5, *Overview of the Proposed Project*, summarizes project features. Section 6.6, *Overview of Alternatives to the Project*, provides an overview of the alternatives. Section 6.7, *Alternatives Eliminated from Further Consideration*, presents alternatives to the project that were considered but eliminated for further analysis. Section 6.8, *Alternatives to the Project*, presents alternatives fully analyzed in this EIR and provides a comparison of each alternative's environmental effects to those of the project. Section 6.9, *Comparative Impacts of Project to All Alternatives*, sets forth a table that summarizes the relative impacts of all of the alternatives as compared to the project. Section 6.10, *Environmentally Superior Alternative*, makes a determination about the environmentally superior alternative analyzed in this EIR.

6.2 Summary of Project Impacts Relevant to Evaluation of Alternatives

Potentially significant adverse environmental impacts that would result from the project are evaluated in Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*. The mitigation measures and impact conclusions are summarized in Chapter 1, *Executive Summary*, which includes a summary chart of impact conclusions for all topic areas. This EIR concludes that the project has the potential to cause significant environmental impacts in the following categories:

- Aesthetics (cumulative)
- Agriculture and Forest Resources (cumulative)
- Air Quality (project and cumulative)
- Biological Resources (cumulative)
- Cultural Resources (cumulative)
- Energy Resources (cumulative)
- Geology and Soils (cumulative)
- Greenhouse Gas Emissions (project and cumulative)

- Hydrology and Water Quality (cumulative – groundwater supply)
- Mineral Resources (project and cumulative)
- Noise (cumulative)
- Utilities and Service Systems (cumulative – water supply)

The significant and unavoidable impacts of the proposed project are discussed below.

6.2.1 Aesthetics and Visual Resources

As explained in Section 4.1, *Aesthetics and Visual Resources*, with regard to impacts on visual resources, the project has the potential to contribute significantly to cumulative impacts within the region. Moreover, due to the project's proposed location within an existing oil and gas field, the impacts of the project together with the impacts of past, present, and reasonably foreseeable future oil and gas development, including wells and abandonment activity to implement carbon capture and storage projects, constitute cumulative impacts. However, because there are no scenic vistas or Designated State Scenic Highways within the project area, the proposed project would have a less than significant impact on these resources. Additionally, with mitigation, the project would not degrade existing visual characteristics or the quality of the site and its surroundings. With mitigation, the project would also not create new sources of lighting that would adversely affect nighttime views in the area. Overall, even with mitigation, the project's contribution to significant impacts associated with visual character and quality in the project area would be cumulatively significant and unavoidable.

6.2.2 Agricultural Resources

As explained in Section 4.2, *Agricultural Resources*, with regard to impacts on significant agriculture and forest resources, the project has the potential to contribute significantly to cumulative impacts within the region. Moreover, even with mitigation, the project would have a significant and unavoidable impact with respect to its potential to contribute to the cumulative conversion of farmland due to the importance of the region's agricultural resources. However, with mitigation, the project would have a less than significant impact related to conflicts with the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use. Additionally, the project would have a less than significant impact related to conflicts with Williamson Act contracts, conflicts with forest land zoning, forestland conversion, and cancellation to an open space contract within Kern County. Overall, the project's incremental effects on agricultural resources would be cumulatively considerable and, even with mitigation, this potentially significant cumulative impact would be significant and unavoidable.

6.2.3 Air Quality

As explained in Section 4.3, *Air Quality*, with regard to significant impacts on air quality, the project has the potential to contribute significantly to cumulative impacts within the region. Moreover, the project's specific emissions would contribute to Kern County's 2020 emissions inventory and to the 2025 projected emissions of Kern County. However, with mitigation, the project would have a less than significant impact related to conflicts with the adopted regulatory programs incorporated within the San Joaquin Valley Air Pollution Control District's ozone and particulate matter attainment plans. The project would have a significant unavoidable impact regarding a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under applicable federal or state ambient air quality standards. With mitigation, the project would have a less than significant impact regarding exposure of sensitive receptors to substantial pollutant concentrations. Overall, the project's incremental effects on air quality would be cumulatively considerable, and, even with mitigation, this potentially significant cumulative impact would be significant and unavoidable.

6.2.4 Biological Resources

As explained in Section 4.4, *Biological Resources*, with mitigation, the project's potential to have a direct or indirect adverse effect on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by wildlife agencies would be less than significant. Also, with mitigation, the project's potential to have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by wildlife agencies would be less than significant. The project's potential to have a substantial adverse effect on federally protected wetlands through direct removal, filing, hydrological interruption, or other means would be less than significant with mitigation. Likewise, with mitigation, the project would not interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors or impede the use of wildlife nursery sites. The project would not conflict with any local policies or ordinances protecting biological resources, such as tree preservation policies or ordinances. Moreover, any adverse impacts related to the project's potential to conflict with the provisions of a habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan would be mitigated to a less than significant level. However, the project would make a cumulatively considerable contribution to cumulative biological resource impacts, even with mitigation.

6.2.5 Cultural Resources

As explained in Section 4.5, *Cultural Resources*, with mitigation, the project would have a less than significant impact with respect to its potential to cause a substantial adverse change in the significance of a historic resource. Similarly, with implementation of mitigation measures described in Section 4.5, the project would have a less than significant impact with respect to its potential to cause a substantial adverse change in the significance of an archaeological resource. Moreover, with mitigation, the project would have a less than significant impact with respect to its

potential to directly or indirectly destroy a unique paleontological resource, site, or feature. With mitigation, the project would also have a less than significant impact with respect to its potential to disturb any human remains. However, even with mitigation, the project would make a cumulatively considerable contribution to impacts regarding historic, archaeological, or paleontological resources or human remains, and such impact is significant and unavoidable.

6.2.6 Energy Resources

As explained in section 4.6, *Energy*, the project would have a less than significant impact with respect to its potential to cause a substantial environmental impact due to an unnecessary consumption of energy. The project would also not significantly conflict with or obstruct state or local plans for renewable energy or energy efficiency. However, due to the project's proposed location within an existing oil and gas field, the impacts of the project together with the impacts of past, present and reasonably foreseeable future oil and gas development including wells and abandonment activity to implement carbon capture and storage projects constitute cumulative impacts. Therefore, even with mitigation, the project has the potential to contribute significantly to cumulative impacts within the study area.

6.2.7 Geology and Soils

As explained in Section 4.7, *Geology and Soils*, with mitigation, the project would have a less than significant impact regarding its potential to cause substantial adverse effects due to the rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, or landslides. With mitigation, the project would also have a less than significant impact regarding the potential to result in substantial soil erosion or loss of topsoil, nor be located on expansive soil or a geologic unit or soil that is unstable or could become unstable due to the project. The project would further have no impact regarding the project's ability to support the use of septic tanks or alternative wastewater disposal systems because the project would not include the development of septic systems or alternative wastewater disposal systems. With mitigation, the project would also have a less than significant impact regarding its potential to destroy unique paleontological resources, sites, or unique geologic features as defined by CEQA guidelines Section 15064. However, due to the uncertainty of the implementation of multiple projects and the ability to simultaneously cease injection during an event, the impacts from cumulative induced seismic activity from this project plus any future permitted carbon capture and storage (CCS) project is significant and unavoidable even with mitigation.

6.2.8 Greenhouse Gas Emissions

As explained in Section 4.8, *Greenhouse Gas Emissions*, the project's potential adverse effects related to direct and indirect greenhouse gas (GHG) emissions would be mitigated to less than significant levels. However, the project would conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHG, thus causing a significant and unavoidable impact, even with mitigation. Finally, the project would make a cumulatively

considerable contribution to a cumulative GHG emissions impact, even with mitigation, and this impact is therefore significant and unavoidable.

6.2.9 Hydrology and Water Quality

As explained in Section 4.10, *Hydrology and Water Quality*, the project's potential to substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of a groundwater basin would be less than significant with mitigation. In addition, the project's potential to conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan would be less than significant with mitigation. The project also would not violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. And, with mitigation, the project will not substantially alter existing drainage patterns or place housing in flood hazard areas. Nor would the project expose people or structures to flooding risks with implementation. However, the project's potential cumulative hydrology and water quality (groundwater supply only) impacts would be significant and unavoidable with mitigation.

6.2.10 Mineral Resources

As explained in Section 4.12, *Mineral Resources*, the project's impact with respect to its potential to 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 would be significant and unavoidable, even with mitigation. Additionally, the project's impact with respect to its potential to 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 would be significant and unavoidable with mitigation. Finally, the project's potential cumulative mineral resource impacts would be significant and unavoidable with mitigation.

6.2.11 Noise

As explained in Section 4.13, *Noise*, the project has the potential to contribute to cumulative impacts within the study area. Oil and gas activities could occur anywhere in the CCS project area, and the combined noise levels from the proposed project and existing or reasonably foreseeable projects depend on the proximity of oil and gas activities to other project-related noise sources at a specific location. The potential contribution of the proposed injection and monitoring wells to an impact on sensitive receptors more than 4 miles away for operations and 2 to 4 miles away for construction would not be cumulatively considerable. However, noise generated from the construction of wells authorized under the project could be in excess of 65 A-weighted decibels community noise equivalent level up to 4,000 feet from a construction site. Therefore, significant noise impacts would occur if there were sensitive noise receptors within 4,000 feet of the construction of a well. Other projects with construction or operations occurring concurrently with construction or operations of a proposed well would also contribute to noise levels experienced by nearby sensitive noise receptors. Even with implementation of MM 4.13-1, which requires preparation of a noise reduction report, and site-specific attenuation measures for activities within

4,000 feet of sensitive receptors, cumulative impacts would remain due to noise from nearby oil and gas development. Therefore, although the project's cumulative contribution to cumulative noise is minor, cumulative impacts remain significant and unavoidable.

6.2.12 Utilities and Service Systems

As explained in Section 4.19, *Utilities and Service Systems*, with mitigation, the project's potential to require or result in the relocation or construction of new or expanded wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects, would be less than significant. Additionally, with mitigation, the project would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years and impacts would be less than significant. Because the project would not generate a significant amount of wastewater from operations, the potential for the project to result in a determination by the wastewater service provider that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments would be less than significant. With mitigation, the project's potential to generate solid waste in excess of state or local standards, or in excess of local infrastructure, or otherwise impair the attainment of solid waste reduction goals would be less than significant as well. Implementation of mitigation along with compliance with applicable statutes and regulations would also ensure compliance with policies to reduce waste sent to landfills, reducing impacts to less than significant. In regard to cumulative impacts, the project could result in significant impacts on utilities and service systems relative to water supply. As the Kern County subbasin is currently over drafted and the West Kern Water District's Groundwater Sustainability Plan has been deemed inadequate, along with the other Kern subbasin plans where the other similar known and unknown projects could occur, the cumulative impacts of any use of groundwater in the area are considered cumulatively significant and unavoidable after all feasible and reasonable mitigation.

6.3 Project Objectives

The project proponent has defined the following objectives for the project:

- Construct and operate a permanent underground storage facility to develop and use existing carbon dioxide (CO_2) storage capacity at Elk Hills in an economically feasible manner.
- Contribute to CRC's adopted goals of Full-Scope Net Zero emissions for Scope 1 (direct greenhouse gas emissions), Scope 2 (indirect greenhouse gas emissions associated with the purchase of electricity/steam/heat/cooling) and Scope 3 (all other indirect greenhouse gas emissions resulting from the company's business operations) emissions by 2045 by capturing and storing CO_2 emissions from CRC's Elk Hills field gas operations.
- Support California's Executive Order B-55-18, for California to achieve carbon neutrality by 2045 and net negative emissions thereafter.

- Site and design the project in an environmentally responsible manner consistent with current Kern County and California guidelines.
- To promote economic development and bring living-wage jobs to Kern County.

6.4 Process Used to Develop/Screen Alternatives

The alternatives to the project analyzed in this EIR were selected through a two-step process. First, the County identified potential alternatives based on the comments it received during the EIR scoping process and though internal deliberations that took into consideration the overall project objectives. Then, the County screened out those alternatives that it determined would not meet most of the project objectives, were infeasible, would not substantially reduce any of the project's significant environmental effects, or were not otherwise reasonable or realistic. Third, the County identified those alternatives that passed the screening criteria and that represent a range of available options to carry forward for analysis in this chapter.

6.5 Overview of the Proposed Project

The project is the consideration of the approval of multiple Conditional Use Permits (CUPs) (CUP No. 13 Map No. 118, CUP No. 14 Map No. 118, CUP No. 5 Map 119, CUP No. 6 Map 119, CUP No. 3, Map 120, CUP No. 2 Map No. 138) and related changes in zoning designations (Zone Change Case [ZCC] No. 5, Map 119 and ZCC No. 4, Map 120) for the construction and operation of a 9,104-acre CCS facility with related capture facilities and pipeline for the initial source. The facility consists of U.S. Environmental Protection Agency (EPA) Class VI Underground Injection Control (UIC) wells, approximately 11 miles of facility and injection pipeline for capture from the pre-combustion gas, and related infrastructure improvements for the capture, transfer, and storage of CO_2.

The process of CCS involves capturing carbon from the atmosphere or an emitting industrial facility and storing (sequestering) it underground (for example, in a depleted oil and gas field). Under high pressure, the captured gas reacts with other subterranean chemicals and water to mineralize, turning to rock.

The source of CO_2 for injection as part of this project would be the Elk Hills oilfield (Elk Hills) gas, from which CO_2 is captured and processed at the existing cryogenic and fractionation natural gas plant (CGP-1) facility within Elk Hills. No additional sources of CO_2 (from outside Elk Hills) or other new development are proposed for the CCS Surface Land Area. The captured CO_2 would then be transported by facility pipeline to the dedicated Class VI UIC wells for the project, all of which would be located within the CUP boundary. The CO_2 would be injected into the identified geographically confined reservoirs for storage, in perpetuity.

The project would be developed in two phases for capture site infrastructure, facility pipelines and injection wells. A total of six Class VI UIC injection wells would be installed. Phase 1 wells would consist of three new wells plus one modified existing well, and Phase 2 wells would consist of two

modified Class II wells used for enhanced oil recovery. Additionally, 10 existing wells would be converted to monitoring wells, and six existing wells would be converted into seismic monitoring wells.

The proposed project at full operation is designed to capture up to 1.46 million tons of concentrated CO_2 in Section 26R during Phase 1, and up to 750,000 tons of concentrated CO_2 in Section A1A2 in Phase 2, for a total of 2,210,000 tons capacity for injection per year. As part of Phase 1, 101,743 tons per year (tpy) of compressed CO_2 would be injected, and as part of Phase 2, up to 101,743 tpy of compressed CO_2 would be injected, for a total of up to 203,485 tpy.

6.6 Overview of Alternatives to the Project

Under CEQA, and as indicated in California Public Resources Code Section 21002.1(a), the identification and analysis of alternatives to a project is a fundamental aspect of the environmental review process and is required to ensure the consideration of ways to mitigate or avoid the significant environmental effects of a project. Based on the significant environmental impacts of the proposed project, the aforementioned objectives established for the proposed project, and the feasibility of the alternatives considered, two alternatives, including the No Project Alternative as required by CEQA, are considered in this chapter and summarized in Table 6-1. The Environmentally Superior Alternative, as required by CEQA, is described in Section 6.10, *Environmentally Superior Alternative*, below.

6.7 Alternatives Eliminated from Further Consideration

Kern County considered several alternatives to reduce the project's significant and unavoidable impacts. Per CEQA, the lead agency may make an initial determination as to which alternatives are feasible and warrant further consideration, and which are infeasible. The following alternatives were initially considered but were eliminated from further consideration in this EIR because they do not meet project objectives and/or were infeasible.

6.7.1 Drilling Ban on All Lands "Leave It in the Ground" Alternative

A drilling ban on all land would implement a "leave it in the ground" alternative. This alternative extends beyond denying or modifying the project to a policy decision to amend Chapter 19.98 the Zoning Ordinance to prohibit all oil and gas exploration, development, and production activities within the project area. Further, it would require that existing oil and gas wells and all facilities relying on that production and being considered for the CCS project would be required to cease, and all affected land would be required to be restored to its pre-exploration condition. This alternative assumes that the ban extends to the UIC Class VI wells needed for injection as well. An alternative where another source, not related to fossil fuel production, is used for the CCS project, such as direct air capture (DAC), is analyzed in Section 6.8.2, below. This alternative is outside the

scope of the privately funded project under consideration and does not meet three out of the five project objectives. Further the environmental impacts of construction activities to remove and restore land utilized for oil and gas exploration, extraction and production by the industry in Kern County, encompassing over 596,199 acres for just the administrative oilfield, would exceed all the thresholds and project specific impacts of this project in all categories. Alternatives are required by CEQA to reduce one or more impacts that are significant and unavoidable to less than significant. While the production of various criteria pollutants and CO_2 from the use of the fuel would be reduced, the reduction would be offset from the remediation activities. In addition to failing to meet most of the project objectives, an alternative that completely bans all new oil and gas exploration, development, and production activities is infeasible due to existing legal restrictions on the County's authority to prohibit access to subsurface mineral interests without liability. Since the Drilling Ban on All Lands Alternative is legally infeasible and would not achieve most of the project's basic objectives, as well as being beyond the scope of the project and this EIR, it is rejected for analysis in this EIR.

6.7.2 Replacement of Elk Hills Power Plant with Renewable Energy

This alternative would involve the decommissioning of the Elk Hills Power Plant and replacing the 550 MW of electricity generated with a renewable source of energy. The Elk Hills Power Project is a nominal 550-megawatt (MW) natural gas-fired, combined-cycle, cogeneration power plant on 12 acres, certified by the California Energy Commission (CEC) on December 6, 2000, and began commercial operation on July 24, 2003. This alternative would address one of the project objectives: Support California's Executive Order B-55-18, for California to achieve carbon neutrality by 2045 and net negative emissions in years after 2045. It is, however, beyond the scope of this project for the County to exert regulatory control over the Elk Hills Power Plant and direct decommissioning. As a power plant producing power over 50 MW, it is under the complete authority of the CEC. The CEC and California Public Utilities Commission are working on a long-term strategy by 2045 to decarbonize all California electricity which includes retirement of all natural gas power plants. Such a strategy, however, has not directed to date retirement for the Elk Hills Power Plant. The EIR anticipates that if permitted the CCS underground capacity of 48 million tons and 2,210,000 tons per year will, at some point, not include contributions from the Elk Hills Power Plant or oilfield gas sources, but from other legally permitted offsite sources. Further the replacement of 550 MW of gas generated electricity, some of which is used for oilfield production with the remainder going to the Pacific Gas and Electric distribution lines would require an estimated 550 MW of commercial scale solar on at least 3,371 acres and a battery energy storage system capable of storing up to approximately 4,000 megawatt-hours (MWh) of energy storage. While the CO_2 generated in this scenario would be less than generated by the Elk Hills Power Plant, the land use impacts and potential impacts to cultural, biological, and public services would be significant and unavoidable. Since the Replacement of the Elk Hills Power Plant with the Renewable Energy Alternative is legally infeasible, the County has no authority over the Elk Hills Power Plant and would not achieve most of the project's basic objectives, as well as being beyond the scope of the project and this EIR, it is rejected for analysis in this EIR.

6.7.3 Offsite Alternative

The Offsite Alternative would carry out the project in a different location, outside of the San Joaquin Valley Air Basin. The project site, however, was selected because of its proximity to the location of oil and gas resources and infrastructure within the County. As explained in Chapter 3, *Project Description*, the project area was selected because it encompasses the portion of the County in which oil and gas development has historically occurred as the process of CCS involves capturing carbon from existing point sources within an existing oil and gas field and storing it underground (for example, in a depleted oil and gas reservoir).

Furthermore, the selection of the project site was predicated upon the capacity of the pre-existing infrastructure to effectively fulfill the project's objectives while limiting the impact to surrounding land use. All new CCS facilities, including wells, pipelines and ancillary infrastructure, would be operated in areas in which oil and gas activity is currently the primary land use and therefore a compatible land use. There are also no established residential communities within or adjacent to the project area.

The alternative would place the CCS facility outside the San Joaquin Valley Air Basin to reduce the determination of significant and unavoidable for air impacts on air quality based on higher thresholds. The Mojave Air Basin, while in attainment for a number of criteria pollutants and therefore with higher thresholds, has no oil and gas production and therefore has no underground pore space suitable for a CCS project. Thus, this alternative is technically infeasible and therefore, it is rejected for analysis.

It should also be noted that, while CEQA requires an EIR to identify project alternatives, it does not require the EIR to identify alternative project locations. Per the CEQA Guidelines, an EIR must include a reasonable range of "alternatives to the project, *or* to the location of the project" (14 California Code of Regulations. Section 15126.6(a) [emphasis added]). Applicable case law recognizes that CEQA grants lead agencies flexibility to elect to analyze either onsite or offsite alternatives, or both (see Mira Mar Mobile Community v. City of Oceanside, 119 Cal. App. 4th 447, 491 [2004]). There is no requirement under CEQA that an EIR always explore an offsite alternative (see California Native Plant Society v. City of Santa Cruz, 177 Cal. App. 4th 957, 933 [2009]). Thus, CEQA does not require this EIR to analyze the Offsite Alternative.

6.8 Alternatives to the Project

Alternatives that would avoid or substantially lessen any of the significant effects of the project and feasibly attain most of the basic project objectives are evaluated in Sections 6.8.1 through 6.8.3, below. The alternatives are discussed with respect to their relationship to the project's objectives. Kern County has considered the following two alternatives, which are also identified in Table 6-1 and discussed individually below:

- Alternative 1 – "No Project" Alternative
- Alternative 2 – Initial Source - Direct Air Capture Alternative
- Alternative 3 – Nature Based Carbon Storage Alternative

6.8.1 Alternative 1 – "No Project" Alternative

As required by CEQA Guideline §15126.6, this chapter describes and analyzes a "no project" alternative for the purpose of comparing the impacts of approving the project with the impacts of not approving the project. Alternative 1, the No Project Alternative, thus assumes that the project's 9,130-acre CCS facility consisting of EPA Class VI UIC wells, approximately 11 miles of facility and injection pipeline for capture from the pre-combustion gas, and related infrastructure improvements for the capture, transfer, and storage of CO_2 would not be approved or constructed. Accordingly, Alternative 1 assumes that the necessary approval of multiple CUPs to allow for the construction and operation of the CCS underground site installation of six Class VI UIC injection wells, conversion of 10 existing oil wells into monitoring wells, conversion of six existing oil wells into seismic wells, and construction of accessory infrastructure with a CO_2 storage capacity of 48 million metric tons within the A (Exclusive Agriculture) Zone District; and related changes in zoning designations from A-1 (Limited Agriculture) to A (Exclusive Agriculture) would not be approved for project construction and operation.

Moreover, the No Project Alternative would not result in up to 2,210,000 million of concentrated CO_2 storage capacity or inject up to 203,485 tpy of compressed CO_2. Therefore, the No Project Alternative would not contribute to the California Resource Corporation's adopted goals of Full-Scope Net Zero emissions by 2045. Additionally, the No Project Alternative would not support California's Executive Order B-55-18, for California to achieve carbon neutrality by 2045 and net negative emissions thereafter.

Finally, the No Project Alternative would maintain the current zoning, land use classifications, and existing land uses, which consist mostly of existing oil and gas exploration and production, including existing well pads, processing facilities, pipeline routes, and access roads, along with undeveloped desert vegetation. The project site would continue to be utilized for oil and gas extraction. The identified wells on schedule for abandonment under the project would not be abandoned early and would instead be abandoned on the eight-year idle well plan regulations.

Environmental Impact Analysis

Aesthetics

Under the No Project Alternative, no development would take place on the project site. The project site would remain in its current state as an operational oil and gas field, and no change to the scenic vistas or existing visual character of the site would occur. Impacts to scenic resources and daytime and nighttime views in the area would not occur. The No Project Alternative would result in less impact to aesthetics as compared to the proposed project.

Agricultural Resources

Under the No Project Alternative, the project site would remain as an operational oil and gas field. The project site would remain in its current state, containing, wells, pipelines and ancillary infrastructure. As such, the No Project Alternative would not involve changes to the existing environment which could result in the conversion of Farmland or forest land to non-agricultural or non-forest uses. Therefore, No Project Alternative would result in fewer impacts related to agricultural and forestry resources compared to the proposed project.

Air Quality

Under the No Project Alternative, the project site would remain as an operational oil and gas field, and there would be no new construction activities or new operational activities that would generate new air emissions. The No Project Alternative would not contribute to a cumulative net increase of criteria pollutant in the project's region beyond what presently is attributed to existing operations. Therefore, the No Project Alternative would result in less impacts related to air quality compared to the proposed project.

Biological Resources

Under the No Project Alternative, the project site would remain as an operational oil and gas field and existing biological resources within the project area, including special-status plant and wildlife species, would remain undisturbed, since no construction or operation would occur. The project site would remain in its current state, as an operational oil and gas field land containing desert vegetation and would not contribute to a cumulative loss of foraging and nesting habitat for burrowing owls, Swainson's hawk, loggerhead shrike, other raptors, desert kit fox, and migratory bird species that may utilize habitat on the project site. Therefore, the No Project Alternative would result in less impacts related to biological resources compared to the proposed project.

Cultural Resources

Under the No Project Alternative, the project site would remain as an operational oil and gas field, and no new ground disturbing activities would occur. Therefore, disturbance to potential historical resources, archeological resources, or human remains located on site would not occur, and this alternative would not require mitigation. There would be no impact and the No Project Alternative would result in less impacts related to cultural resources as compared to the proposed project.

Energy

Under the No Project Alternative, the project site would remain as an operational oil and gas field, and no new energy consumption activities would occur beyond what presently is attributed to existing operations. As such, the No Project Alternative would not result in wasteful, inefficient, or unnecessary consumption of energy resources and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Therefore, both the No Project Alternative and the project would result in less than significant impacts related to energy. Impacts would be similar as compared to the proposed project.

Geology and Soils

Under the No Project Alternative, the project site would remain as an operational oil and gas field, and no new ground disturbance would occur. As such, the No Project Alternative would not directly or indirectly cause potential substantial adverse effects involving rupture of a known earthquake fault or strong seismic ground shaking, result in substantial soil erosion or loss of topsoil, or directly or indirectly destroy a unique paleontological resource or unique geologic feature. Therefore, the No Project Alternative would result in fewer impacts related to geology and soils compared to the proposed project.

Greenhouse Gas Emissions

Under the No Project Alternative, the project site would remain as an operational oil and gas field, and no construction or new operational activities would occur. Elks Hills would continue to emit GHG emissions as a result of ongoing operations. GHG emission reductions resulting from operation of the proposed CCS facility would not be realized. Impacts would be less than significant under this alternative; however, impacts from implementation of this alternative would be greater than those of the project as it would not result in the capture of GHG emissions attributed to the project.

Hazards and Hazardous Materials

Under the No Project Alternative, the project site would remain as an operational oil and gas field, and no construction or new operational activities would occur. The project site would remain in its current condition. This alternative would continue to involve the use, transport, and disposal of hazardous materials associated with the project site; 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. Both the project and the No Project Alternative would result in significant impacts relative to the use, transport and disposal of hazardous materials. Therefore, the project and the No Project Alternative would result in similar impacts.

Hydrology and Water Quality

Under the No Project Alternative, the project site's existing hydrology would remain unchanged, as no development or ground disturbance would occur on the project site. As such, this alternative would not violate water quality standards or waste discharge requirements; substantially alter the existing drainage patter of the site or area in a manner that would substantially increase the rate or amount of surface runoff which would result in flooding on site or off site; create or contribute

runoff water which would exceed the capacity of existing or planned storm water drainage system; contribute to inundation by a flood hazards, tsunami, or seiche; or conflict with or obstruct implementation of a water quality control plan or groundwater management plan. Therefore, the No Project Alternative would result in less impact related to hydrology and water quality as compared to the proposed project.

Land Use Planning

The No Project Alternative would not develop any new uses at the project site and would thus not require any of the submitted land use applications. Current land uses on the site are consistent with the zoning and Kern County General Plan (KCGP) land use classifications; however the current A-1 zoning is not consistent with the KCGP . It would remain inconsistent and limit uses. The No Project Alternative would not cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. The proposed project also would result in less than significant land use impacts. Impacts relative to Land Use would be similar under the project and the No Project Alternative.

Mineral Resources

Under the No Project Alternative, the project site would remain as an operational oil and gas field, and no ground disturbance would occur. There are no mineral resources on the project site or in the project area. As such, the No Project Alternative would not result in the loss of availability of locally important mineral resource recovery site delineated on a local general plan, Specific Plan, or other land use plan. Therefore, the No Project Alternative would result in less impact related to mineral resources compared to the project.

Noise

Under the No Project Alternative, the project site would remain as an operational oil and gas field. New noise sources from construction and operation would not be present on site beyond what is presently attributed to existing operations, and existing noise conditions would remain the same. As such, the No Project Alternative would not result in generation of a substantial temporary or permanent increase in ambient noise levels or generate excessive ground-borne vibration. Therefore, the No Project Alternative and the project would result in less than significant impacts related to noise. Impacts would be similar as compared to the project.

Population and Housing

Under the No Project Alternative, the project would remain as an operational oil and gas field. As such, the No Project Alternative would not result in substantial population growth require the removal or displacement of any residential structures or inhabitants; therefore, no housing would be displaced, and the project would not require construction of replacement housing elsewhere. Because of the rural nature of the project area, no new population or housing resources would be required beyond what is presently attributed to existing operations for either the No Project Alternative or the project. Therefore, the No Project Alternative and the project would result in less

than significant impacts related to population and housing. Impacts would be similar as compared to the proposed project.

Recreation

Under the No Project Alternative, the project site would remain as an operational oil and gas field and no new demand for recreational facilities would occur. As such, the No Project Alternative would not increase the use of recreational facilities or require construction or expansion of recreational facilities. Because of the rural nature of the project area, no new recreational resources would be required beyond what is presently attributed to existing operations for either the No Project Alternative or the project. Therefore, the No Project Alternative and the project would result in less than significant impacts related to recreation. Impacts would be similar as compared to the proposed project.

Public Services

Under the No Project Alternative, the project site would remain as an operational oil and gas field and no new demand for fire or police protection services would occur beyond what presently is attributed to existing operations. Furthermore, no new demand for schools, parks, or other government facilities would occur beyond what presently is attributed to existing operations. As such, the No Project Alternative would not result in the need for new or physically altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, or other government facilities. The project could require increased fire protection and emergency response services, necessitating the construction of new or altered facilities. Therefore, impacts would be less under this Alternative as compared to the proposed project.

Transportation and Traffic

Under the No Project Alternative, the project site would remain as an operational oil and gas field, and no new transportation activities would occur beyond what presently is attributed to existing operations. Existing traffic patterns and volumes on nearby roadways would remain unchanged. As such, the No Project Alternative would not conflict with a program, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities and not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b). In addition, the No Project Alternative would not substantially increase hazards due to a geometric design feature or result in inadequate emergency access. Therefore, both the No Project Alternative and the project would result in less impact related to transportation and traffic. Impacts would be similar as compared to the proposed project.

Tribal Cultural Resources

Under the No Project Alternative, the project site would remain as an operational oil and gas field, and no ground disturbing activities would occur. The No Project Alternative would not involve construction in the vicinity of the aforementioned tribal cultural resources, the No Project Alternative would not cause a substantial adverse change in the significance of a tribal cultural resources 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) or as a resource determined by the lead agency. Therefore, the No Project Alternative would result in less impact related to tribal cultural resource compared to the proposed project.

Utilities and Service Systems

Under the No Project Alternative, the project site would remain as an operational oil and gas field and there would be no new demand for utilities and service systems on the project site. As such, the No Project Alternative 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; impact water supplies; generate solid waste in excess of State or local standards; or conflict with federal, state, and local management and reduction statues and regulations related to solid waste. The project would result in significant unavoidable water supply impacts. Therefore, the No Project Alternative would result in less impact related to utilities and service systems compared to the proposed project.

Wildfires

Under the No Project Alternative, the project site would remain as an operational oil and gas field and would not exacerbate existing wildfire risks within the area. The CCS project also would not increase wildfire risks. Therefore, the No Project Alternative would result in similar impacts related to wildfires compared to the proposed project.

Comparative Impacts of Alternative 1

The No Project Alternative would avoid creating nearly all of the significant and unavoidable impacts associated with the proposed project. This alternative would result in less impact to all remaining environmental issue areas with the exception of GHGs; since this alternative would not capture GHG emissions through the operation of a CCS facility, impacts to GHGs would be greater under this alternative.

Alternative 1's Relationship to the Project Objectives

The No Project Alternative would not achieve any of the project objectives listed above in Section 6.3, *Project Objectives*, including assisting California in reducing GHG emissions. Although this alternative would create less environmental impacts overall, the objectives that shape the project would not be realized under this alternative.

6.8.2 Alternative 2 – Initial Source Direct Air Capture Alternative

Under Alternative 2, the project proponent would not capture the gas from the oilfield as the initial source but instead utilize a DAC system for an unknown location off site to capture atmospheric CO_2 emissions in place of a conventional amine-based capture system. DAC is a technology that

captures CO_2 directly from the atmosphere, usually through a mechanical system, although some passive capture techniques are also being developed. In a mechanical system, fans or wind are used to drive ambient air through a contactor unit, where the air passes across a chemical sorbent that selectively reacts with and traps CO_2, allowing the other components of the air to pass through and exit the system. Currently, the most developed adsorbent materials are in liquid or solid forms (Kern County Carbon Management Business Park – Report 2023, Appendix K-2).

DAC is an engineered equivalent to photosynthesizing plants, except that DAC captures CO_2 from the atmosphere at a faster rate and with a much smaller land footprint than biomass (nature-based solutions; refer to Alternative 3). Furthermore, DAC delivers CO_2 in a pure, compressed form. Captured atmospheric CO_2 can be permanently and safely stored in geologic reservoirs to deliver negative emissions or be used to produce low carbon intensity products, such as synthetic fuels that work in existing vehicles and infrastructure.

Current DAC technologies are primarily distinguished by using one of two types of sorbents: liquid solvents (L-DAC) and solid sorbents (S-DAC). In both techniques, DAC pulls air from the atmosphere and passes it over the sorbent material. The sorbent material captures the CO_2, and the rest of the air passes through and exits the DAC unit. L-DAC typically uses hydroxide solutions (a liquid solvent) as the bonding sorbent, whereas S-DAC relies on a CO_2 "filter" or dry amine-based chemical sorbents. In both cases, the CO_2 from the air is chemically bound into a new compound, and then is subsequently broken down to release (1) a high-purity stream of CO_2 for storage, and (2) the original sorbent components for reuse.

Both technologies require electricity and heat to operate; the electricity drives the fans and controls inlet systems, while the heat releases the trapped CO_2. However, S-DAC requires temperatures of only approximately 100 degrees Celsius (°C) to break the chemical bonds linking the CO_2 to the sorbent material, whereas L-DAC requires temperatures around 900 °C. Such temperatures are difficult to reach using renewable energy sources like wind or solar. If natural gas is used to attain the necessary heat, the associated CO_2 released from the use of L-DAC technology would need to be recaptured and stored to avoid counteracting the benefit of DAC.

While the direct land footprint of DAC is smaller than that of alternative carbon-removal processes, it requires renewable energy to operate, which results in large amounts of commercial scale solar. A DAC capable of generating 1 million tons a year of CO_2 for injection would require over 1,600 acres of land (228 MW) of energy. This land use would be in addition to the 9,130 acres required for the carbon capture area.

DAC facilities are expected to produce zero or-near zero emissions onsite that could be hazardous to the environment or human health. Hazardous waste is not a significant concern for DAC facilities.

Wastewater is also not generated in significant amounts in DAC processes, as the only water used is contained within close-loop systems. Some DAC operations actually produce water as part of the process. Solid waste buildup can occur in the CO_2 recovery equipment, as happens in traditional monoethanolamine (MEA) scrubbers that are used for point source carbon capture. Similar

environmental regulation and disposal guidelines would need to be followed. Chemicals used in sorbent plants would degrade over time as heat is applied to release captured CO_2, but those degradation products (e.g., ammonia) are expected to be contained within the DAC plant and not released into the environment and have established regulation and disposal protocols.

Liquid DAC (L-DAC) requires approximately 2.8 MWh of energy for every metric ton of CO_2 captured (estimates range from 1.8 to 3.7 MWh per metric ton of CO_2). Each L-DAC contactor unit captures approximately 300 to 600 metric tons per year, and units are modular and stackable. Thus, footprints vary depending on how high units are stacked or how they are spread out. To capture 1 million metric tons of CO_2 per year, we estimate a facility would require about 200 acres of space. Reported estimates range from 50 to 1,730 acres, depending on how contactor units are arranged.

Like the project, Alternative 2 would amend Zoning Ordinance Chapter 19.98 to rezone from A-1 to A for the project and seek approval of the CCS facility with the initial source of a DAC facility. This alternative also would require construction of injection and facility pipelines and injection and monitoring wells, same as proposed under the project.

Comparative Impacts of Alternative 2

Installation of a DAC facility would result in impacts similar to those of the proposed project for many issue areas. While the footprint of the DAC facility would likely be larger than the collective footprint of the CCS surface land area capture facilities under the project (amine units, compressors and pumps), the DAC facility could be sited in any location, as the only feedstock is ambient air and need not be tied to point emissions sources. Therefore, the DAC could be sited in such a way that the footprint avoids impacts on sensitive resources within the CCS Surface Land Area, such as biological habitat or archaeological resources. The DAC could also be cited away from sensitive receptors to help preclude visual or noise impacts. The footprint of the required renewable energy, specifically commercial-scale solar, would significantly increase the impacts on biology, cultural and air quality during construction.

Like the project, the Initial Source Air Capture Alternative would result in short-term construction impacts related to air quality, GHG emissions, geology and soils, hydrology and water quality, noise, and traffic.

A DAC facility would result in generally the same operational impacts as the project, as it would require routine inspections and maintenance, requiring a limited number of employees and trips to the project site. Therefore, operational traffic, noise and mobile source air quality impacts would be similar. Other impacts associated with operational characteristics would be similar as well including population and housing, recreation, public services, and utilities.

The Initial Source Air Capture Alternative would result in a substantial reduction in stationary source GHG and air emissions. The Initial Source Air Capture Alternative is independent of any point source generator and therefore, is not dependent on the continued operation of the oil and gas field for an emissions source for capture. The DAC facility would have some energy and water

supply demands dependent upon the technology employed but would ultimately result in net negative GHG emissions from the project.

Alternative 2's Relationship to the Project Objectives

Alternative 2 would achieve most of the project objectives. The DAC Alternative would meet objectives 1, 3, 4 and 5 in their entirety. The alternative would, like the project, create a permanent underground storage facility for CO_2, in an economically feasible manner; it would support the State's net zero target for carbon neutrality; it would site and design the project in an environmentally responsible manner; and it would promote economic development in the County. It would partially meet objective #2 in that it would reduce emissions from the project area; however, the DAC facility would not specifically tie to existing emissions sources as defined in the objective.

6.8.3 Alternative 3 – Nature Based Carbon Storage Alternative

Alternative 3, the Nature Based Carbon Storage Alternative, would replace the mechanical capture of CO_2 and storage in the underground oil and gas reservoir rock layer with planting of trees or other type of appropriate crop in order to store atmospheric CO_2. Currently, the proposed project site is located in Elk Hills, an existing oil and gas field where the area characterized by extensive oil and gas exploration and production, including existing well pads, processing facilities, pipeline routes, and access roads. Under this alternative, the project proponent would have to cease and remove all oil and gas exploration and production equipment within Elk Hills and then utilize the area for a nature-based carbon storage alternative. The most applicable nature-based carbon storage alternative for the area of the project site would be regenerative agriculture, as it coincides with the current zoning. Planting of trees would be one example of regenerative nature-based carbon storage for the highest ability to store atmospheric carbon. If 9,000 acres of the project site were remediated of all oil and gas facilities and prepared for planting, an estimated 400 to 1,000 trees per acre could be planted, resulting in a new forest area of 3.6 million to 9 million trees. The type of tree and planting configuration will affect the species selected. Characteristics of the best trees for carbon removal, instead of cover crops include the use of fast-growing trees as they store the most carbon during the first decades of their lifespan and act as carbon sinks, trees with wide crowns and large leaves that are best for efficient photosynthesis and the selection of native tree species that are compatible with local soil and disease-resistant trees that require no fertilizers.

Comparative Impacts of Alternative 3

Soil remediation activities would result in short-term impacts to air quality, and impacts associated with hazardous materials (potential upset and dispersion of contaminated soils), as would project activities. The use of the land for trees would significantly impact landscape based biological resources including native desert habitats; however, there would be other biological contributions to wildlife (nesting raptors) that could outweigh those for other species. The impact on energy would be reduced from those of the project; however, the impacts on water supply would increase.

Alternative 3's Relationship to the Project Objectives

The projected storage capacity of the project is 48 million tons with anticipated sources from hard to decarbonize industries such as concrete, chemical blending and hydrogen. Additionally, CARB has identified CCS as a short-term strategy to decarbonize the use of natural gas power plants until they can be phased out. The storage of CO_2 within trees would have no impact on industrial decarbonization efforts. It would, however, reduce the need for DAC installation and large amounts of land needed for solar production for that use as well as the CCS underground storage space itself and related land use restrictions. The contribution of the nature-based solution over a projected time span to 2045 is not comparable, however, to CCS. Table 4.8-6 in Section 4.8 *Greenhouse Gas Emissions*, details 31.2 million tons of CO_2 permanently stored underground from the project. The higher estimates for vegetive storage via trees projects at 1,000 pounds per tree over 20 years for fast growing trees), results in an estimate of 1.8 million tons to 4.5 million tons of CO_2 permanently stored in the new forest by 2024 (CARB 2022). The use of the land for nature-based carbon removal, while providing less than significant impacts, would not meet the project objectives or reduce as much CO_2 as the project capacity itself for decarbonizing critical industries such as concrete production.

6.9 Comparative Impacts of Project to All Alternatives

A summary of the comparative impacts of the Project to the alternatives analyzed in this EIR is provided in Table 6-1.

Table 6-1: Summary Comparison of Alternative Impacts

Issue Area	Project Summary of Impacts	Alternative 1 No Project	Alternative 2 DAC Alternative	Alternative 3 Nature Based Carbon Storage Alternative
Aesthetics and Visual Resource	Less than significant	Less than project	Greater than project	Less than project
Agricultural and Forest Resources	Less than significant	Less than project	Greater than project	Same as project
Air Quality	Significant and unavoidable	Less than project	Construction: Greater than project Operational: Less than project	Less than project
Biological Resources	Less than significant	Less than project	Greater than project	Same as project
Cultural Resources	Less than significant	Less than project	Greater than project	Same as project
Energy	Less than significant	Same as project	Same as project	Less than project
Geology and Soils	Less than significant	Less than project	Same as project	Less than project
Greenhouse Gas Emissions	Significant and unavoidable	Greater than project	Less than project	Less than project
Hazards and Hazardous Materials	Less than significant	Same as project	Same as project	Same as project
Hydrology and Water Quality	Less than significant	Less than project	Same as project	Less than project
Land Use and Planning	Less than significant	Same as project	Same as project	Same as project
Mineral Resources	Significant and unavoidable	Less than project	Same as the project	Same as the project
Noise	Less than significant	Same as project	Less than project	Less than project
Population and Housing	Less than significant	Same as project	Same as project	Less than project
Public Services	Less than significant	Less than project	Same as project	Less than project
Recreation	Less than significant	Same as project	Same as project	Less than project

Table 6-1: Summary Comparison of Alternative Impacts

Issue Area	Project Summary of Impacts	Alternative 1 No Project	Alternative 2 DAC Alternative	Alternative 3 Nature Based Carbon Storage Alternative
Transportation and Traffic	Less than significant	Same as project	Same as project	Less than project
Tribal Cultural Resources	Less than significant	Less than project	Greater than project	Less than project
Utilities and Service Systems	Less than significant	Less than project	Same as project	Greater than the project (water supply)
Wildfire	Less than significant	Same as project	Same as project	Greater than the project

6.10 Environmentally Superior Alternative

Identification of an environmentally superior alternative is required under CEQA (California Code of Regulation Section 15126.6(e)(2)). Alternative 1, the No Project Alternative would be environmentally superior to the project on the basis of the minimization or avoidance of physical environmental impacts but would have greater impacts than the project for GHG emissions. Section 15126.6(e)(2) of the CEQA Guidelines state that if the No Project Alternative is found to be environmentally superior, "the EIR shall also identify an environmentally superior alternative among the other alternatives." Although Alternative 1 is the environmentally superior alternative in certain issue areas, it is not capable of meeting any of the project objectives. Due to the substantial reduction of impacts from GHG emissions and meeting most of the project objectives, Alternative 2, Initial Source Direct Air Capture Alternative, is considered the environmentally superior alternative.

Alternative 2 Initial Source – Direct Air Capture reduces the significant and unavoidable GHG emissions impacts of the project and would substantially reduce operational stationary source air emissions. This alternative would have greater impacts on aesthetics, biological resources, cultural resources, noise, and tribal cultural resources than the project would due to the larger footprint. Alternative 2 would continue to have significant and unavoidable impacts on mineral resources, and cumulative effects on agricultural and forest resources, air quality, geological resources, hydrology, and utilities, similar to the project. Although Alternative 1 would have fewer and less severe significant impacts than Alternative 2, Alternative 2 would achieve most of the project's objectives as described above.

Chapter 7

Response to Comments

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Chapter 7
Response to Comments

This chapter is reserved for, and will be included in, the Final EIR.

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Chapter 8

Organizations and Persons Consulted

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Chapter 8

Organizations and Persons Consulted

8.1 Federal

Federal Aviation Administration

Federal Communications Commission

U.S. Bureau of Land Management

U.S. Department of Agriculture

U.S. Environmental Protection Agency Region IX

U.S. Fish and Wildlife Service

8.2 State of California

California Air Resources Board

California Department of Conservation

California Department of Fish and Wildlife

California Department of Transportation

California Department of Water Resources

California Energy Commission

California Environmental Protection Agency

California Natural Resources Agency

California Public Utilities Commission

California Regional Water Quality Control Board, Central Valley Region

California State Senate

California State University Bakersfield Library

California Workforce Development Board

Governor's Office of Business and Economic Development

Native American Heritage Council

Public Policy Institute of California

8.3 Regional and Local

Bakersfield City Planning Department

Bakersfield City Public Works Department

Buttonwillow County Water District

Buttonwillow Recreation and Parks District

Buttonwillow Union School District

California City Planning Department

California State University Bakersfield

Center for Biological Diversity

Center on Race, Poverty and the Environment

City of Arvin

City of Bakersfield

City of Maricopa

City of McFarland

City of Ridgecrest

City of Shafter

City of Taft

City of Tehachapi

City of Wasco

Defenders of Wildlife

Delano City Planning Department

Elk Hills School District

Employers' Training Resource

Greater Bakersfield Chamber of Commerce

Inyo County Planning Department

Kern Audubon Society

Kern Citizens for Energy

Kern Community College District

Kern County Environmental Health Services Department

Kern County Farm Bureau

Kern County Fire Department

Kern County Library

Kern County Public Works Department

Kern County Sheriff's Department

Kern County Superintendent of Schools

Kern County Water Agency

Kings County Planning Agency

Los Angeles Co Regional Planning Department

McKittrick School District

Native American Heritage Council

North West Kern Resource Conservation District

Pacific Gas and Electric Company

San Bernardino Co Planning Department

San Joaquin Valley Center on Race, Poverty and the Environment

San Luis Obispo Co Planning Department

San Manuel Band of Mission Indians

Santa Barbara Co Resource Management Department

Sierra Club, Kern Kaweah Chapter

Southern California Gas Company

South San Joaquin Valley Arch Info Center

Southern California Gas Company

Taft Union High School District

Tehachapi Indian Tribe

Torres Martinez Desert Cahuilla Indians

Tulare County Planning and Development Department

Twenty-Nine Palms Band of Mission Indians

U.S. Bureau of Land Management

U.S. Department of Agriculture

U.S. Environmental Protection Agency Region IX

U.S. Fish and Wildlife Service

U.S. Geological Survey

U.S. National Park Service

U.S. Nuclear Regulatory Commission

U.S. Forest Service

U.S. Army Corps of Engineers

U.S. Department of Energy

U.S. Department of the Interior

U.S. Department of Transportation

U.S. Environmental Protection Agency

U.S. Federal Aviation Administration

U.S. Federal Communications Commission

U.S. Public Policy Institute of California

U.S. State Senate

U.S. Transportation Security Administration

U.S. Department of Veterans Affairs

U.S. Department of Homeland Security

U.S. Department of Housing and Urban Development

U.S. Department of Justice

U.S. Department of Labor

U.S. Department of State

U.S. Department of the Treasury

U.S. Department of Health and Human Services

U.S. Department of Defense

U.S. Department of Commerce

U.S. Department of Education

U.S. Department of the Army

U.S. Department of the Navy

U.S. Department of the Air Force

U.S. Department of the Marine Corps

U.S. Department of Veterans Affairs

U.S. Department of Homeland Security

U.S. Department of Justice

U.S. Department of Labor

U.S. Department of State

U.S. Department of the Treasury

U.S. Department of Health and Human Services

U.S. Department of Defense

U.S. Department of Commerce

U.S. Department of Education

8.4 Private

Adams, Broadwell, Joseph and Cardozo

Aera

Baker Hughes

California Independent Petroleum Association (CIPA)

Chevron, USA

Dolores Huerta Foundation

E&B Natural Resources Management

Ensign

Exon/Mobile Production Company

GE Energy

Golden Gate University School of Law

Halliburton

Hathaway, LLC

Hess Corporation

Independent Oil Producers' Agency (IOPA)

International Brotherhood of Electrical Workers

JB Energy Partners

Kern Economic Development Corporation

Kern Oil and Refining

Key Energy Services, Incorporated

Large Scale Solar Association

Laborers International Union of North America (LIUNA)

LINN Energy, LLC

Livermore Lab Foundation

Lozeau Drury LLP

Macpherson Oil Company

Mt Poso CoGen Company, LLC

Nabors Completion and Production

Naftex Operating Company

PLCL Pluss International, Incorporated

PLC Industrial Services

QK Incorporated

San Juaquin Refining

Schlimberger Oilfield Services

Senica Resources Corporation

Stanford University

Sturgeon Services International

Total Western

Tricor Refining, LLC

Venoco, Incorporated

Vintage Production California

Weatherford Completions

Western States Petroleum Association (WSPA)

WZI, Incorporated

Chapter 9

List of Preparers

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Chapter 9
List of Preparers

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Mr. Brian Shoener, Principal Engineer

Ms. Kristin Pittack, Senior Water Resources Planner

Ms. Kristin Muller, Assistant Report Writer

Ruettgers & Schuler Civil Engineers

Ian J. Parks, Principal/Project Manager, Senior Engineer

Soils Engineering, Inc.

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Trinity Consultants

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WSP USA, Inc.

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Rebecca Frohning, Lead Scientist

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Amber Santilli, Word Processor

Chapter 10

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Chapter 10
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4.0 Environmental Setting

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Chapter 11

Acronyms and Abbreviations

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Chapter 11
Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
2022 Scoping Plan	2022 Scoping Plan for Achieving Carbon Neutrality
A	Exclusive Agriculture
A.D.	Anno Domini
A-1	Limited Agriculture
AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
AMSL	above mean sea level
ANSI	American National Standards Institute
AOR	Area of Review
APCO	Air Pollution Control Officer
API	American Petroleum Institute
APN	assessor parcel number
ASM	ASM Affiliates
ASME	American Society of Mechanical Engineers
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measures
B.P.	before the present
BAR	Biological Analysis Report
Basin	Tulare Lake Hydrologic Region
BAU	business as usual
BGEPA	Bald and Golden Eagle Protection Act

BiCRS	biomass carbon removal and storage
BLM	Bureau of Land Management
BMP	best management practice
BPS	Best Performance Standards
BSA	Biological Study Area
C&D	construction and demolition
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFÉ	Corporate Average Fuel Economy
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Occupational Safety and Health Administration
CalARP	California Accidental Release Prevention Program
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen	State of California Green Building Code Requirements
CalHHS	California Department of Health and Human Services
CalOES	California Office of Emergency Services
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAMP	Conservation Area Management Plan
CAO	County Administrative Office
CARB	California Air Resources Board
CAT	Climate Action Team
CCAA	California Clean Air Act
CCAP	Climate Change Action Plan
CCR	California Code of Regulations

CCs	carbon capture and storage
CCUS	Carbon Capture, Removal, Utilization and Storage Program
CDFW	California Department of Fish and Wildlife
CDMA	Carbon Dioxide Management Agreement
CDR	carbon dioxide removal
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERS	California Environmental Reporting System
CESA	California Endangered Species Act
CFC	chlorofluorocarbon
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CGP-1	cryogenic and fractionation natural gas plant
CGS	California Geological Survey
CH_4	methane
CHL	California Historical Landmark
CHP	California Highway Patrol
CIC	Cumulative Impact Charge
CIC-ORPS	Cumulative Impact Oil and Gas Reservoir Pore Space Charge
CIP	Capital Improvement Program
CISN	California Integrated Seismic Network
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent

COG	Council of Government
County	Kern County
CPUC	California Public Utilities Commission
CRC	California Resources Corporation
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CTV I	Carbon TerraVault I (Kern County) Project; *also* project
CUP	Conditional Use Permit
CUPA	Certified Unified Program Agencies
CWA	Clean Water Act
DAC	direct air capture
dB	decibels
=dBA	A-weighted sound level measurement
DAC	direct air capture
DDT	dichlorodiphenyltrichloroethane
District	West Kern Water District; *also* WKWD
DMA	Developer Mitigation Agreement
DMC	Development Mitigation Contracts
DMR	Division of Mine Reclamation
DNL	day/night average sound level; *also* L_{dn}
DOC	California Department of Conservation
DOD	Department of Defense
DOF	California Department of Finance
DOSH	California Division of Occupational Safety and Health
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control

DWR	Department of Water Resources
ECP	Eagle Conservation Plans
EIR	Environmental Impact Report
EISA	Energy Independence and Security Act
Elk Hills	Elk Hills oilfield
EMFAC	Emission Factor Model
EMS	emergency medical services
EO	Executive Order
EOR	enhanced oil recovery
EPA	U.S. Environmental Protection Agency
EPCA	Energy Policy and Conservation Act of 1975
ERC	Emission Reduction Credit
ERP	Emergency Response Plan
ESA	Endangered Species Act
FAA	Federal Aviation Administration
Farmland	Prime Farmland, Farmland of Statewide Importance, and Unique Farmland, collectively
FEED	front-end-engineering design
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazards Severity Zone
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
	FPPA Farmland Protection Policy Act
FRA	Federal Responsibility Area
FTIP	Federal Transportation Improvement Program
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts

GHG	greenhouse gas
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWP	global warming potential
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HARP2	Hotspots Analysis Reporting Program
HCA	High Consequence Area
HCD	California Department of Housing and Community Development
HCP	habitat conservation plan
HFC	hydrofluorocarbon
HMBP	Hazardous Materials Business Plans
HMIS	Hazardous Materials Inventory Statement
HMMP	Hazardous Materials Management Plan
HMRRP	Hazardous Materials Release Response Plan and Inventory Program
HMTA	Hazardous Materials Transportation Act
HRA	Health Risk Assessment
HRRS	Health-Risk Reduction Strategy
HSC	Health and Safety Code
HSWA	Hazardous and Solid Waste Amendments
HUD	Department of Housing and Urban Development
I-5	Interstate 5
in/sec	inches per second
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
IRA	Inflation Reduction Act

IRWM	Integrated Regional Water Management
IRWMP	Integrated Regional Water Management Plan
IS	Initial Study
ISR	Indirect Source Rule
ITP	Incidental take permit
KCEH	Kern County Environmental Health
KCFD	Kern County Fire Department
KCGP	Kern County General Plan
KCPNR	Kern County Planning and Natural Resources Department
KCPWD	Kern County Public Works Department
KEDC	Kern Economic Development Corporation
KGA	Kern Groundwater Authority
LCFS	Low Carbon Fuel Standard
L-DAC	Liquid-solvent direct air capture
L_{dn}	day/night average sound level
L_{eq}	equivalent sound level
LLNL	Lawrence Livermore National Laboratory
Lmax	maximum noise level
LOS	level of service
LPG	liquefied petroleum gas
LRA	Local Responsibility Area
MBTA	Migratory Bird Treaty Act
mD	millidarcy
MDAB	Mojave Desert Air Basin
MEA	monoethanolamine
$\mu g/m^3$	micrograms per cubic meter

mg/L	milligrams per liter
MM	Mitigation Measure
MMscfd	million standard cubic feet per day
MMT	million metric tons
MND	Mitigated Negative Declaration
MPO	metropolitan planning organization
MRZ	Mineral Resource Zone
MSHCP	multiple species habitat conservation plan
MT	metric tons
MW	megawatt
MWh	megawatt hours
MWh	meggawatt-hours
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NACE	National Association of Corrosion Engineers
NAHC	Native American Heritage Commission
NCCP	Natural community conservation plans
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFIP	National Flood Insurance Program
NHD	National Hydrology Dataset
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NLR	Noise Level Reduction
NMFS	National Marine Fisheries Service
NO	nitrogen oxide

NO_2	nitrogen dioxide
NO_3	nitrates
NOC	Notice of Completion
NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NR	Natural Resource
NRA	Natural Resources Agency
NRC	National Response Center
NRCS	Natural Resources Conservation Service
NRF	National Response Framework
NRHP	National Register of Historic Places
NSR	New Source Review
NTSA	National Trails System Act
NWI	National Wetlands Inventory
O&M	operation and maintenance
O_3	ozone
ºC	degrees Celsius
OEHHA	Office of Environmental Health Hazard Assessment
OHWM	ordinary high-water mark
Oil and Gas EIR	Final Environmental Impact Report–Revisions to the Kern County Zoning Ordinance– 2015(C) Focused on Oil and Gas Local Permitting, certified on November 9, 2015, supplemented by a Supplemental EIR certified on December 11, 2018;, a Supplemental and Recirculated EIR certified on March 8, 2021;, and an Addendum adopted on August 23, 2022

Oil and Gas Ordinance	Kern County Zoning Ordinance for local permitting for oil and gas, focused on Chapter 19.98 (Oil and Gas Production)
OPR	Office of Planning and Research
OPS	Office of Pipeline Safety
OSAE	Office of Audits and Evaluation
OSFM	Office of the State Fire Marshal
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PEER	Permit-Exempt Equipment Registration
PERC	tetrachloroethylene
PFC	perfluorocarbon
PG&E	Pacific Gas and Electric
PHMSA	Pipeline and Hazardous Material Safety Administration
PM	particulate matter
$PM_{0.1}$	ultrafine particles
PM_{10}	respirable particulate matter
$PM_{2.5}$	fine particulate matter
Porter-Cologne	Porter-Cologne Water Quality Control Act
ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
project	Carbon TerraVault I (Kern County) Project
project proponent	California Resources Corporation; *also* CRC
PSD	Prevention of Significant Deterioration
PSI	pounds per square inch

PSIA	Pipeline Safety Improvement Act
psig	pounds per square inch gauge
PSM	Process Safety Management
PTO	Permit to Operate
PVC	polyvinyl chloride
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
RDEIR	Recirculated Draft Environmental Impact Report
rDME	renewable dimethyl ether
RFS	renewable fuel standards
RMP	Risk Management Program
RMS	root mean square
RNG	renewable natural gas
ROG	reactive organic gases
ROW	right-of-way
RPF	Registered Professional Forester
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SAFE	Safer Affordable Fuel-Efficient
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SCADA	supervisory control and data acquisition
SCS	sustainable community strategies
S-DAC	solid-sorbent direct air capture
SDNHM	San Diego Natural History Museum

SDWA	Safe Drinking Water Act of 1974
SEL	sound exposure level
SENL	single event noise exposure level
SF_6	sulfur hexafluoride
SFVAB	San Joaquin Valley Air Basin
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Officer
SHRC	State Historical Resources Commission
SIP	State Implementation Plan
SJV	San Joaquin Valley
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLCP	short-lived climate pollutants
SLF	Sacred Lands File
SMARA	Surface Mining and Reclamation Act of 1975
SMBHI	San Manuel Band of Mission Indians
SMGB	State Mining and Geology Board
SMR	steam methane reforming
SO_X	sulfur oxides
SPCC	Spill, Prevention, Control, and Countermeasure
SR	State Route
SRA	State Responsibility Area
SREIR	Supplemental Recirculated Environmental Impact Report
SSC	species of special concern
SSREIR	Second Supplemental Recirculated Environmental Impact Report
State	State of California

STC	Sound Transmission Class
Subbasin	Kern County Subbasin
SO_4^{2-}	sulfate
SWP	State Water Project
SWPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TDS	total dissolved solids
TIA	Traffic Impact Analysis
TMDL	total maximum daily load
tpy	tons per year
U.S.C.	United States Code
UFC	Uniform Fire Code
UIC	Underground Injection Control
UNG	underground natural gas
UNGS	underground natural gas storage
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDOT	U.S. Department of Transportation
USDW	underground source of drinking water
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
UWMP	Urban Water Management Plan
VdB	vibration decibels
VERA	Voluntary Emission Reduction Agreement
VMT	vehicle miles traveled

VOC	volatile organic compound
Warren-Walquist Act	Warren-Alquist Energy Resources Conservation and Development Act
WDR	waste discharge requirements
WJVA	WJV Acoustics, Inc.
WKWD	West Kern Water District; *also* District
WOUS	Waters of the United States
WSA	Water Supply Assessment
WST	well stimulation treatment
ZCC	Zone Change Case

Chapter 12

List of Appendices

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Chapter 12

List of Appendices

Appendix A Notice of Preparation and Public Review

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- A-5 Public Review Workshops: Presentation Materials and Comments
- A-6 Summary of Written Public Comments on Draft EIR (December 2023)
- A-7 Draft EIR (December 2023) – Comments Received

Appendix B Air Quality and Greenhouse Gas Emissions Technical Documentation

- B-1 Air Quality Impacts Analysis
- B-2 Failure Investigation Report
- B-3 Miscellaneous Air Quality Attachments
- B-4 CO_2 Dispersion Modeling

Appendix C Biological Resources Technical Documentation

- C-1 Biological Analysis Report
- C-2 Conservation Easement Deed – Elk Hills Conservation Area
- C-3 Conservation Easement Deed – Elk Hills Conservation Area Map

Appendix D Cultural Resources

Appendix E Geology and Soils

- E-1 Preliminary Soil and Geological Evaluation
- E-2 U.S. Environmental Protection Agency Class VI Underground Injection Control (UIC) Permit Application Narratives for the Elk Hills 26R Storage Project and the A1A2 Storage Project (applications available at the time of the recirculation)
- E-3 26R Storage Project Draft Permits
- E-4 Paleontological Records Search

Appendix F Hazards and Hazardous Materials Technical Documentation

Appendix G Hydrology and Water Quality Technical Documentation

- G-1 Hydrology Report
- G-2 Water Supply Assessment

Appendix H Noise Assessment

Appendix I Transportation Technical Documentation

Appendix J Tribal Cultural AB-52 Outreach

Appendix K Other References

K-1 Energy: CTV Fuel Usage Calculations
K-2 Carbon Management Business Park 2023 Report
K-3 EPA Pamphlet
K-4 Source Identification Memo