KERN COUNTY
Planning & Natural Resources

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NOTICE OF INTENT FOR PUBLIC REVIEW AND HEARING ON THE MITIGATED NEGATIVE DECLARATION FOR THE GURDIAL SINGH TRAVEL CENTER PROJECT

This is to advise that the Kern County Planning and Natural Resources Department has prepared a Mitigated Negative Declaration (MND) for the project identified below. As mandated by State law, the minimum public review period for this environmental document is 30 days.

PROJECT TITLE: Gurdial Singh Travel Center Project by LAV Consulting and Engineering; PLN25-00129; Precise Development Plan No. 19, Map 121, Zone Variance No. 12, Map 121.

PROJECT LOCATION: Southwest corner of Stockdale Highway and Interstate 5, also being a portion of Section 6, Township 30 South, Range 25 East, MDB&M, County of Kern, State of California; APN: 160-030-32.

DOCUMENT AVAILABILITY: The MND for the above referenced proposed project is available for public review at the Planning and Natural Resources Department, which is located at the address listed above or it can be accessed on the Kern County Planning and Natural Resources Department website at: **https://kernplanning.com/planning/mnd**

AGENCY/PUBLIC COMMENT: The Planning and Natural Resources Department solicits the comments of agencies, interested parties, and surrounding property owners on the environmental analysis contained in the Initial Study and proposed MND for the project. Any comments should be submitted to the Planner whose contact information is identified below prior to the close of the public review period. As mandated by State law, the MND public review period for the proposed project is 30 days.

September 30, 2026 – October 29, 2026

Written comments may be submitted to the project Planner identified below prior to the close of the public review period on **Thursday, October 29, 2026, at 5:00 p.m.** to:

Kern County Planning and Natural Resources Department
ATTN: April Wentworth, Planner II
2700 "M" Street, Suite 100, Bakersfield, CA 93301
Phone: (661) 862-5043
E-mail: WentworthA@kerncounty.com

PUBLIC HEARING: A public hearing has been scheduled for Director's Hearing to consider approval on the proposed project and solicit comments on the adequacy and completeness of the proposed mitigation measures described in the MND. You may comment by providing testimony at the public hearing on:

DATE: **November 19, 2026**
TIME: **10:00 A.M. or soon thereafter**
LOCATION: **Director's Hearing**
Kern County Planning and Natural Resources Department
2700 M Street, Suite 1-A, Bakersfield, CA 93301

This matter would only be considered by the Kern County Board of Supervisors in the event an appeal to the decision of the Director or Appointed Hearing Officer is filed. If such an appeal is filed after consideration by the Director or Appointed Hearing Officer 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 prior to any action by the Board of Supervisors on the matter.

PROJECT DESCRIPTION: The project proposes a Precise Development Plan to allow a 12,303-square-foot travel center on a 10.6-acre portion of a 26.41-acre parcel. The proposed travel center will include a convenience store, a fast-food drive-thru restaurant with a limited dine-in area, one service station for standard vehicles with 16 auto fuel pumps, and a 9 bay semi-truck diesel fueling station with an associated semi-truck scale. The proposed travel center will operate 24 hours a day, 7 days a week, with an anticipated 8-12 full-time employees per shift. The travel center includes an office, convenience store, food and beverage sales (including closed lid alcohol), and a fast-food restaurant with drive-thru and limited dine-in seating area. Additional services for long haulers include a small lounge with couches, televisions, a vending machine and a separate restroom with shower area. The site plan includes 49 truck parking spaces intended for short term and overnight use, four electric vehicle (EV) charging stations, and six heavy truck (EV) charging stations. Above ground fuel storage tanks with a maximum storage capacity of 100,000 gallons of diesel and 100,000 gallons of gasoline would be located in the northern portion of the project site. The proposed project includes a request for a Zone Variance to construct a pole sign with a 300-square-foot sign face where a maximum 240-square-foot sign face is permitted and a 70-foot sign height where a maximum 35-foot sign height is permitted.

CRAIG M. MURPHY, Director
Planning and Natural Resources Department

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

THE BAKERSFIELD CALIFORNIAN
MIDWAY DRILLER

CH (09/22/2026)

PD#19, ZV#12, Map 121
Gurdial Singh (PP26128)

103 270 23 00 6
KOSAREFF EDWARD J &
KATHERINE
4714 DUNFORD RD
BUTTONWILLOW CA 93206-9769

159 010 08 00 4
LEE ROBERT & STEPHANIE 2006
FAMILY TRUST
876 WINSTON AV
SAN MARINO CA 91108-1429

104 270 11 00 8
LYNN TRUCKING INC
16394 BAY BROOK AV
RIVERSIDE CA 92504

104 270 19 00 2
LYNN TRUCKING INC
16934 BAY BROOK AV
RIVERSIDE CA 92504

160 030 34 00 5
MARAHD PROPERTIES LLC
PO BOX 20190
BAKERSFIELD CA 93390

104 270 10 00 5
ONE HERITAGE PROP LLC
8939 S SEPULVEDA BL STE 100
LOS ANGELES CA 90045

160 030 33 00 2
REDDY ASHOKA MALLADI
2 IVY BEND LN
SUGAR LAND TX 77479-4568

160 030 36 00 1
REDDY ASHOKA MALLADI
349 MAPLEHURST PT
HIGHLANDS RNCH CO 80126

160 030 35 00 8
REDDY SANDEEP & DEEPIKA LIV
TR
10005 MESA OAK DR
BAKERSFIELD CA 93311

160 030 32 00 9
SINGH GURDIAL & KAUR BALBIR
7370 EDGEWATER ST
CHOWCHILLA CA 93610-8443

159 010 09 00 7
BUENA VISTA WATER STORAGE
DISTRICT
PO BOX 756
BUTTONWILLOW CA 93206

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

U. S. Fish & Wildlife Service
Division of Ecological Services
2800 Cottage Way #W-2605
Sacramento, CA 95825-1846

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

U.S. Postal Service
Address Management Systems
28201 Franklin Parkway
Santa Clarita, CA 91383-9321

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

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

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

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

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

Earthworks
1958 University Ave
Berkley CA, 94704

Kern River Groundwater
Sustainability Agency
1600 Truxtun Aven
Bakersfield , California 93301

Leadership Counsel for Justice &
Accountability
Attn: Emma De La Rosa
1522 18th Street
Bakersfield, CA 93301

LIUNA
6800 District Boulevard
Bakersfield CA 93313

California Resources Corp
Attn: Minerals Mgt
11109 River Run Boulevard
Bakersfield, CA 93311

Kevin Johnston
2476 Buena Vista Avenue
Livermore, CA 94550

Northcutt and Associates
4220 Poplar Street
Lake Isabella, CA 93240-9536

Thomas Roads Improvement Program
PARSONS
1600 Truxtun Avenue, 3rd Floor
Bakersfield, CA 93301

Standard School Dist
1200 North Chester Avenue
Oildale, CA 93308

Kern High School Dist
5801 Sundale Avenue
Bakersfield, CA 93309

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

Local Agency Formation Comm/LAFCO
5300 Lennox Avenue, Suite 303
Bakersfield, CA 93309

Oildale Mutual Water Co
P.O. Box 5638
Bakersfield, CA 93388

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

North of the River Rec & Parks Dist
3825 Riverlakes Dr.
Bakersfield, CA 93312

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

Golden Empire Transit
1830 Golden State Avenue
Bakersfield, CA 93301

Kern Mosquito Abatement Dist
4705 Allen Road
Bakersfield, CA 93314

North of the River Muni Water Dist
P.O. Box 5638
Bakersfield, CA 93388-5638

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

AT&T California
OSP Engineering/Right-of-Way
4901 Ashe Road
Bakersfield, CA 93313

Center on Race, Poverty
& the Environnent
5901 Christie Avenue, Suit 208
Emeryville, CA 94608

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

Defenders of Wildlife
P.O. Box 401
Folsom, CA 95763

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

Joyce LoBasso
P.O. Box 6003
Bakersfield, CA 93386

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
P.O. Box 513249
Los Angeles, CA 90051

David Laughing Horse Robinson
P.O. Box 20849
Bakersfield, CA 93390

Tejon Indian Tribe
Attn: Curtis Alcantar
4941 David Road
Bakersfield CA 93307

~~Pacific Gas & Electric Co~~
~~Matt Coleman, Land Mgt~~
~~1918 "H" Street~~
~~Bakersfield, CA 93301-4319~~

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

Kern County Public Works Department/Building & Development/Floodplain

Kern County Public Works Department/Building & Development/Survey

Kern County Public Works Department/Building & Development/Code Compliance

Kern County Public Works Department/Building & Development/Development Review

Kern County Env Health Services Department

Kern County Airports Department

Kern County Sheriff's Dept
Administration

Kern County Fire Dept
Aaron Duncan

MITIGATED
NEGATIVE DECLARATION

TO WHOM IT MAY CONCERN:

Pursuant to the California Environmental Quality Act of 1970 (CEQA),* the State CEQA Guidelines,** and the Kern County Guidelines for Implementation of CEQA and State CEQA Guidelines,*** the Kern County Planning and Natural Resources Department has made an Initial Study of possible environmental impacts of the following-described project:

APPLICANT: Gurdial Singh by LAV Consulting and Engineering (PP26128)

APPLICATION: (a) Precise Development Plan No. 19, Map No. 121; (b) Zone Variance No. 12, Map No. 121 (PLN25-00129)

LOCATION: Southwest corner of Stockdale Highway and Interstate 5, also being a portion of Section 6, Township 30 South, Range 25 East, MDB&M, County of Kern, State of California; Assessor's Parcel Number: 160-030-32.

DESCRIPTION OF PROPOSED PROJECT: (a) A Precise Development Plan to allow development of a 12,303-square-foot all-inclusive travel center with two (2) service stations, and 49 semi-truck parking spaces (Section 19.34.020.C.3, 4 and 5); and (b) A Zone Variance to construct a pole sign exceeding both the sign face and height maximum requirements (Section 19.34.110.A.7) in a CH PD (Highway Commercial – Precise Development Combining) District.

The project site consists of a 9.61-acre portion of a 26.41-acre parcel within the unincorporated portion of western Kern County. Approximately 2 acres of off-site roadway improvements would be provided along Stockdale Highway, Elk Valley Road and three new proposed public roadways. The site is zoned CH PD (Highway Commercial – Precise Development Combining) and is designated 6.3 (Highway Commercial) under the Kern County General Plan.

Access to the site is provided from Stockdale Highway via Elk Valley Road. Stockdale Highway is a major road classified as an arterial alignment (110-foot right-of-way) per the Kern County General Plan Circulation Element). Elk Valley Road is currently unimproved and is a major road classified as an arterial alignment (110-foot right-of-way) per the Kern County General Plan Circulation Element. Three new public roads would be developed as part of the project to provide multiple ingress and egress access points to the travel center.

The project site is located in the unincorporated area of Kern County that is not served by municipal sewage and is greater than 1,000 feet from a connection to municipal sewer. The project proponent proposes drilling a new water well to provide both fire flow and domestic water and proposes to construct a single onsite wastewater treatment system with a separate area for a septic system sized to serve the project. Separate water storage tanks will be constructed for both domestic and fire service. The required water storage for fire flow will be determined in consultation with the Kern County Fire Department.

The applicant is requesting land use approval of the following:

(a) Precise Development Plan to allow a 12,303-square-foot travel center to include a convenience store, a fast-food drive-thru restaurant with a limited dine-in area, one service station for standard vehicles with 16 auto fuel pumps, a 9 bay semi-truck diesel fueling station with an associated semi-truck scale, 49 semi-truck parking spaces and 4 electric vehicle charging stations.

(b) A Zone Variance to construct a pole sign with a 300-square-foot sign face where a maximum 240-square-foot sign face is permitted and a 70-foot sign height where a maximum 35-foot sign height is permitted (Section 19.34.110.A.7) in a CH PD (Highway Commercial – Precise Development Combining) District.

The travel center will operate 24 hours a day, 7 days a week, with an anticipated 8-12 full-time employees per shift. The travel center includes an office, convenience store, food and beverage sales (including closed lid alcohol), and a fast-food restaurant with drive-thru and limited dine-in seating area. Additional services for long haulers include a small lounge with couches, televisions, a vending machine and a separate restroom with shower area. The site plan includes 49 truck parking spaces intended for short term and overnight use and four electric vehicle (EV) charging stations. Above ground fuel storage tanks with a maximum storage capacity of 100,000 gallons of diesel and 100,000 gallons of gasoline would be located in the northern portion of the project site.

MITIGATION MEASURES Included in the Proposed Project to Avoid Potentially Significant Effects (if required):

(1) All exterior/outdoor lighting fixtures shall comply with Chapter 19.81 (Outdoor Lighting "Dark Skies Ordinance") of the Kern County Zoning Ordinance. Lighting fixtures shall not exceed a height of 20 feet above grade, if freestanding, or the height of the building upon which they are attached. Light fixtures shall be maintained in sound operating conditions at all times.

(2) The development shall comply with all requirements of the San Joaquin Valley Air Pollution Control District during all onsite grading and construction activities. The applicant shall implement all required measures to control fugitive dust including but not limited to watering active construction areas, stabilizing disturbed soils, covering haul trucks, and limiting vehicle speeds on unpaved surfaces, in accordance with District rules and regulations.

(3) Prior to the issuance of grading permits, the project proponent shall submit to the Kern County Planning and Natural Resources Department for its review and approval a landscape design and planting plan, which shall include a landscaped buffer along project frontage and throughout the site, as shown on Plot Plan. The landscaping shall be consistent with the visual character of the surrounding area, including but not limited to, such as native and drought tolerant plants. The total landscaped area shall be a minimum of five (5) percent of the total developed area within the project site and the total landscaped area within the parking lot(s) shall be a minimum of five (5) percent of the total parking lot area(s). Site plan and building permit approvals shall require that buffer area landscaping between Stockdale Highway and Interstate 5 and the development area shall be installed no later than completion of landscaping improvements for development located adjacent to the buffer area.

(4) Prior to the issuance of grading permits, the project proponent shall provide evidence of the following: All construction-related areas shall be kept clean and tidy by storing construction materials and equipment within the proposed construction staging and laydown areas and/or generally away from public view. The project proponent shall remove construction debris promptly at intervals of two weeks or less.

(5) Prior to issuance of grading or building permits, the project proponent shall submit a Fugitive Dust Control Plan to San Joaquin Air Pollution Control District (SJAPCD) for review and approval. The Fugitive Dust Control Plan shall reduce emissions, during construction of particulate matter that is

10 microns or less and 2.5 microns or less in diameter (PM_{10} and $PM_{2.5}$). 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 and that shall not increase any other environmental impacts, including loss of vegetation.

(2) All material excavated or graded will be sufficiently 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 percent 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. Construction activities may continue if dust suppression measures are used to minimize visible dust plumes. The measures shall follow the San Joaquin Air Pollution Control District's Reasonably Available Control Measures Regulation VIII (Fugitive PM10 Prohibitions), including Rules 8011 and 8021, and implement Best Available Control Measures (BACMs) or more stringent measures to ensure that:

(a) the visible dust plumes are not transported off the project site or within 400 feet of any regularly occupied structure not owned by the project proponent;

(b) the visible dust plumes generated from linear construction are not transported 200 feet beyond the centerline of the linear facilities and do not cause a traffic obscuration hazard on public roads.

(4) Track-out debris onto public paved roads shall not extend 25 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.

(5) All hauling materials shall be moist while being loaded into dump trucks.

(6) All haul trucks hauling soil, sand and other loos 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 six inches or the freeboard of the truck.

(8) Drop heights shall be minimized when loaders dump soil into trucks.

(9) Gate seals shall be tight on dump trucks.

(10) Traffic speeds on unpaved roads shall be limited to a maximum of 15 miles per hour.

(11) All grading activities shall be suspended when visible dust emissions exceed 20 percent or wind speeds are greater than 30 miles per hour.

(12) Other fugitive dust control measures shall be implemented as necessary to comply with San Joaquin Air Pollution Control District Rules and Regulations.

(13) Disturbed areas should be minimized.

(6) The project proponent shall continuously comply with the following during construction of the proposed project facilities:

(a) All off-road construction diesel engines not registered under California Air Resources Board's Statewide Portable Equipment Program, which have a rating of 50 horsepower or more, shall meet, at a minimum, the Tier 4 California Emissions Standards for Off-Road Compressions-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 4 engine is not available for any off-road engine larger than 100 horsepower, that engine shall be equipped with retrofit controls that will provide nitrogen oxides and particulate matter emissions that are equivalent to Tier 4 engines. An exemption from these requirements may be granted by Kern County in the event that the applicant documents that (1) equipment with the required tier is not reasonably available (e.g., reasonability factors to be considered include those available within Kern County within the scheduled construction period), and (2) corresponding reductions in criteria pollutant emissions are achieved from other construction equipment.

(b) All equipment shall be turned off when not in use. Engine idling of all equipment shall be minimized.

(7) Prior to occupancy, the project proponent shall post signs in clear view of drivers stating that idling for longer than five (5) minutes is prohibited by the California Air Resources Board Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor vehicle idling. The project proponent shall continuously comply with all San Joaquin Valley Air Pollution Control District Rules and regulations during operations of the project.

(8) Prior to occupancy, the project proponent shall install auxiliary power hookups in the truck parking area that are capable of providing power to a minimum of 11 truck-transportation refrigeration units or auxiliary cab power. The project proponent shall also install signage in the truck parking areas that restrict the use of diesel-powered auxiliary power units.

(9) Prior to occupancy, the project proponent shall provide electric vehicle (EV) parking spaces for the motoring public and employee vehicles, as follows:

(a) A minimum of 4 EV chargers shall be installed within the project site and shall be completed prior to occupying the travel center.

(b) A minimum of 6 EV heavy truck chargers shall be installed within the project site and shall be completed prior to occupancy of the travel center.

(10) Prior to issuance of building permits, the project proponent shall implement the following Valley Fever Provisions:

(a) Provide evidence to the Kern County Planning and Natural Resources Department that the project operator and/or construction manager has developed a "Valley Fever Training Handout", training, and schedule of sessions for education to be provided to all construction personnel. All evidence of the training session materials, handout(s) and schedule shall be submitted to the Kern County Planning and Natural Resources Department within 24 hours of the first training session. Multiple training sessions may be conducted if different work crews will come to the site for different stages of construction; however, all construction personnel shall be provided training prior to beginning work. The evidence submitted to the Kern County Planning and Natural Resources Department regarding the "Valley Fever Training Handout" and Session(s) shall include the following:

(b) A sign-in sheet (to include the printed employee names, signature, and date) for all employees who attended the training session.
(c) Distribution of a written flier or brochure that includes educational information regarding the health effects of exposure to criteria pollutant emissions and Valley Fever.
(d) Training on methods that may help prevent Valley Fever infection.
(e) A demonstration to employees on how to use personal protective equipment, such as respiratory equipment (masks), to reduce exposure to pollutants and facilitate recognition of symptoms and earlier treatment of Valley Fever. Where respirators are required, the equipment shall be readily available and shall be provided to employees for use during work. Proof that the demonstration is included in the training shall be submitted to the county. This proof can be via printed training materials/agenda, DVD, digital media files, or photographs.

(11) Prior to issuance of a building permit for restaurants using under-fired charbroilers, the project proponent shall demonstrate compliance with the San Joaquin Valley Air Pollution Control District's particulate matter emissions control requirements for under-fire charbroilers.

(12) Prior to the issuance of grading permits, a one-time fee shall be paid to the Kern County Public Health Services Department in the amount of $3,200 for Valley Fever public awareness programs.

(13) Prior to issuance of a grading or building permit, the project proponent shall retain a Lead Biologist who meets the qualifications of an Authorized Biologist acceptable to the California Department of Fish and Wildlife (CDFW) to oversee compliance with protection measures for all listed and other special-status species. All appropriate contact information for the selected biologist shall be provided to the Kern County Planning and Natural Resources Department. The Lead Biologist, or their Designated Compliance Manager (other qualified biologists designated by the Lead Biologist to perform the Lead Biologist function), shall be on the project site during construction of any perimeter fencing or grading activities throughout construction phases. The Lead Biologist shall have the right to halt all activities that are in violation of the special-status species protection measures. Work shall proceed only after hazards to special-status species have been appropriately addressed through compliance with required mitigation measures and appropriate consultation with USFWS and California Department of Fish and Wildlife (CDFW) when appropriate (i.e., when required by law). The Lead Biologist shall have in his/her possession a copy of all the compliance measures while work is being conducted on the project site. In addition to the above listed duties, the Lead Biologist or their Designated Compliance Manager shall be responsible for implementation of the following provisions:

(a) Construction Work Hours
The project Lead Biologist shall ensure that construction activities within 50 feet of the outside edge of the project footprint containing habitat for special-status wildlife will be minimized between sunset and sunrise, and all construction-related lighting will be turned off during that period, with the exception of lighting for maintenance, security patrols, and emergency (defined by an imminent threat to life or significant property) activities. Lighting for maintenance within 50 feet of the outside edge of the project footprint containing habitat for special-status wildlife will be directed away from natural areas.

(b) Flagging/Fencing/Demarcation
The project Lead Biologist shall designate the construction area and any buffer zones using highly visible materials in the field and review with the contractor in accordance with the final grading plan.

(c) Debris/Non-Native Vegetation/Pollution
The project Lead Biologist shall monitor construction to ensure:

(1) Fully covered trash receptacles that are animal-proof will be installed and used to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Trash contained within the receptacles will be removed at least once a week from the construction site.

(2) No litter, construction materials, or debris will be discharged into state-jurisdictional waters.

(3) All uses of weed and pest control compounds shall comply with the application restrictions mandated by the U.S. Environmental Protection Agency and the California Department of Pesticide Regulation.

(4) Construction work areas shall be kept clean of debris, such as cable, trash, and construction materials. All construction/contractor personnel shall collect all micro trash and litter (anything shiny, such as broken glass), vehicle fluid containers, and food waste from the project area on a daily basis.

(5) All disturbed invasive plants shall be removed from the work site and not used in mulching, composting, etc. If weed biomass must be removed from the site to a designated disposal area, propagules shall be secured in a tarp (without holes or rips) and then carried to a vehicle. Biomass shall be properly wrapped to prevent plant parts from blowing away in transit, and vehicles carrying weed biomass shall be inspected prior to leaving the site to ensure that no plant parts are resting on the bumpers, tailgates, or other exposed areas.

(d) Vehicle and Equipment Restrictions and Maintenance

The project Lead Biologist shall monitor construction to ensure:

(1) Maximum construction vehicle speed will be 15 miles per hour (mph) within the project footprint. Nighttime construction shall be minimized to the extent possible. However, if nighttime construction or construction-related activity (e.g., security patrols, equipment maintenance) is necessary, then the speed limit shall be 10 mph.

(2) Vehicles and equipment access will be limited to the project footprint and ingress and egress on existing roads.

(3) Staging and storage areas for spoils, equipment, materials, fuels, lubricants, and solvents will be located outside the state-jurisdictional channels and within the designated project footprint. Stationary equipment, such as motors, pumps, generators, compressors, and welders, located within or adjacent to state-jurisdictional waters shall be positioned over drip-pans or other containment. Prior to refueling and lubrication, vehicles and other equipment shall be moved away from the state-jurisdictional channels.

(e) Erosion/Silt

The project Lead Biologist shall monitor construction to ensure:

(1) During construction activities, temporary erosion control devices, such as straw bales, silt fencing, and sand bags, shall be used to prevent siltation in state-jurisdictional areas. Coir rolls, erosion control mats or blankets, straw or fiber wattles, or similar erosion control products shall be composed of natural-fiber, biodegradable materials; photodegradable or other plastic erosion control materials shall be prohibited.

(f) Other Restrictions on Construction Activities and Personnel

The project Lead Biologist shall monitor construction to ensure:

(1) During construction, no pets, such as cats or dogs, should be permitted on the project's construction sites.

(2) No commercial hunting will be authorized or permitted on a portion of the project site under construction.

(3) Any contractor, employee, or agency personnel who are responsible for

inadvertently killing, injuring, or trapping a listed species (e.g., San Joaquin Kit Fox, San Joaquin Antelope Squirrel) shall immediately report the incident to the project Lead Biologist. The project Lead Biologist shall contact the U.S. Fish and Wildlife Service (USFWS) (for federal Endangered Species Act (FESA) species) and California Department of Fish and Wildlife (CDFW) (for California Endangered Species Act (CESA) species) immediately in the case of a dead, injured, or entrapped listed species. The Sacramento USFWS Office and CDFW shall be notified in writing within 3 working days of the accidental death or injury to a listed species during project-related activities with a copy to the Kern County Planning and Natural Resources Department. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information.

(4) To prevent inadvertent entrapment of wildlife (including, but not limited to San Joaquin Kit Fox, San Joaquin Antelope Squirrel, Tipton Kangaroo Rat, and Blunt-nosed Leopard Lizard) during construction, all excavated, steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or be provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped wildlife species. If trapped wildlife are observed, escape ramps or structures shall be installed immediately to allow escape.

(5) All pipes, culverts, or similar structures with a diameter of 4 inches or more that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for wildlife before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If wildlife species are discovered inside a pipe, the project biologist shall flush the species from the pipe. If a federal- or State-listed species is discovered, that section of pipe shall not be moved until the USFWS and/or CDFW has been consulted, as appropriate. If necessary, under the direct supervision of the project biologist, the pipe may be moved once to remove it from the path of construction activity until the species has escaped.

(g) Biological Monitoring and Compliance Documentation

The project Lead Biologist shall be responsible for maintaining a database and/or tracking the following during construction:

(1) Document that required pre-construction surveys, avoidance, mitigation, and/or relocation efforts have been implemented.

(2) Document compliance with construction measures (b)-(f) above.

(3) Document compliance with worker training.

(14) Prior to issuance of grading or building permit and for the duration of construction activities, the project proponent shall demonstrate it has in place a Worker Environmental Awareness Program (WEAP) for all construction workers at the project site. The Lead Biologist shall ensure all construction personnel on-site complete WEAP training prior to conducting any construction related activities on-site. As part of the WEAP training, the project Lead Biologist shall perform the following training-related tasks:

(a) Provide the training materials for WEAP training. These materials shall include the measures and mitigation requirements for protected plant and wildlife species (e.g., avoidance and buffer requirements, nighttime construction limitations, etc.); and applicable fire protection measures. WEAP training will also include driver training to avoid and minimize collision risks with protected species, and reporting protocols in the event that any dead or injured wildlife are discovered.

(b) Send a copy of all WEAP training materials to the Kern County Planning and Natural Resources Department.

(c) Maintain a list on-site of all employees who have undergone WEAP training. A copy of this list shall be provided to the Kern County Planning and Natural Resources Department as necessary.

(15) No more than 14 days prior to commencement of ground disturbing activities as authorized by this permit, a qualified biologist shall conduct a pre-construction survey of the Project site to ensure that no special-status wildlife, such as burrowing owls, Tipton kangaroo rat, giant kangaroo rat, San Joaquin kit fox, etc., and/or plant species have occupied the property. The project proponent shall submit a preconstruction survey report prepared by the qualified biologist to the Kern County Planning and Natural Resources Department describing any wildlife or special status plant species observed during the pre-construction survey.

(a) If any special-status species are identified during the pre-construction survey or during construction activities, the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service shall be contacted, where applicable, regarding the need to obtain any permits or approval from those agencies. Where acceptable to the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service, exclusion zones shall be established and maintained until all construction activities are completed unless said agencies prefer that any affected special-status species be removed and/or relocated in accordance with said agencies adopted guidelines or standard procedures.

(b) Biological resource monitoring during each initial phase of ground disturbance.

(c) Compliance reporting provided to the required oversight agencies for all biological resource field surveys, monitoring, and additional tasks as warranted.

(d) A Worker Environmental Awareness Program outlining special-status species that may access, use or otherwise transverse the project area will be implemented.

(e) If known or natal SJKF dens are identified at any time during construction, protocols enumerated in the USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance (2011) should be implemented, and the appropriate agencies contacted for guidance.

(f) Vertical sided trenching deeper than (2) two feet will include escape ramps at no more than 1:1 ration every 100 feet.

(g) Vertical sided holes that are not capable of being ramped should be covered or otherwise secured to the greatest extent practicable.

(h) Pipes, conduit and similar material (3) three inches or greater should be capped to prevent wildlife from becoming inadvertently trapped in the piping.

(i) If ground-disturbing activities are planned during the nesting season for migratory birds that may nest on or near the site (generally February1 through August 31), nesting bird surveys are recommended prior to the commencement of ground disturbance for project activities. If nesting birds are present, no new construction or ground disturbance should occur with an appropriate avoidance area for that species until young have fledged, unless otherwise approved and monitored by a qualified onsite biologist. Appropriate avoidance should be determined by a qualified biologist. In general, minimum avoidance zones for active nests should be implemented as follows:

(1) Ground or low-shrub nesting non-raptors – 300 feet (91 meters)

(2) Burrowing owl – as appropriate based on nest location, season, existing surrounding activity, and evaluation of owl behavior. Coordination with CDFW may be warranted.

(3) Sensitive raptors (e.g., prairie falcon, golden eagle) – 0.5 miles (0.8 kilometers)

(4) Other raptors – 500 feet (152 meters)

(j) Conduct a small mammal trapping survey to determine presence or absence of sensitive small mammal species.

(16) Prior to the issuance of grading permits, the project proponent shall retain a qualified archaeologist who shall be designated the Lead Archaeologist for the site, defined as an archaeologist meeting the Secretary of the Interior's Standards for professional archaeology, to carry out all mitigation measures related to archaeological and historical resources. Proof of hire shall be submitted to the Kern County Planning and Natural Resources Department.

(17) If any previously unknown archaeological or cultural resources are discovered, work in the area of discovery shall be stopped and a qualified archaeologist contacted to evaluate the find. A copy of the archaeologist's evaluation shall be submitted to the Kern County Planning and Natural Resources Department upon its issuance and any measures recommended by the archaeologist shall be implemented prior to resumption of work in the area of discovery.

(18) Prior to the issuance of grading or building permits, and for the duration of construction activities, the project proponent shall demonstrate it has in place a Worker Environmental Awareness Program (WEAP) for all construction workers at the project site which includes cultural and paleontological resources training. The training shall be prepared and conducted by a qualified Lead Archeologist, defined as an archaeologist that meets the Secretary of the Interior's professional qualification standards in archaeology. The training shall be prepared and conducted by the qualified archaeologist. The training may be in the form of a video. The training may be discontinued when ground disturbance is completed or suspended, but must resume when ground-disturbing activities resume. A sticker shall be placed on hard hats indicating that the worker has completed the cultural training program. Construction personnel shall not be permitted to operate equipment within the construction area unless they have attended the training and are wearing hard hats with the required sticker. A copy of the training transcript and/or training video, as well as a list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be submitted to the Kern County Planning and Natural Resources Department. The purpose of the WEAP Training Program shall be to inform construction personnel of the types of cultural resources that may be encountered during construction, and to bring awareness to personnel of actions to be taken in the event of a cultural resources discovery. This may include: a discussion of applicable cultural resources statutes, regulations and related enforcement provisions; an overview of the prehistoric and historic environmental setting and context, as well as current cultural information regarding local tribal groups; samples or visuals of artifacts that might be found in the project area; and a discussion of what prehistoric and historic archaeological deposits look like at the surface and when exposed during construction. The cultural training program shall include instruction that in the event cultural resources are unearthed during ground-disturbing activities, the project operator shall cease any ground disturbing activities within 100 feet of the find until it can be evaluated by Lead Archaeologist..

(19) The project proponent shall continuously comply with the following: In the event that unanticipated cultural resources are encountered during the course of grading or construction, the project operator/contractor shall cease any ground disturbing activities within 50 feet of the find. Cultural resources may include prehistoric archaeological materials such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock, as well as historic materials such as glass, metal, wood, brick, or structural remnants. The Lead Archaeologist shall evaluate the resource to determine whether it qualifies as either an historical resource or a unique archaeological resource, and, if so, shall recommend appropriate treatment measures, as appropriate, to the Director of Planning and Natural Resources or designee. The project proponent

shall implement such recommended measures if the Director of Planning and Natural Resources or her designee determines that they are feasible in light of project design, logistics, and cost considerations.

Per California Environmental Quality Act (CEQA) 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 CEQA Guidelines Section 15126.4(b)(3)(C), if resources cannot be avoided, additional treatment measures shall be developed in consultation with the Director of Planning and Natural Resources or her designee, and may include testing and evaluation or data recovery excavation. Kern County shall consult with appropriate Native American representatives in determining appropriate treatment for unearthed cultural resources if the resources are prehistoric or Native American in nature. 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.

(20) The project proponent shall continuously comply with the following: If human remains are uncovered during project construction, the project proponent shall immediately halt work within 100 feet of the discovery and contact the Kern County Coroner to evaluate the remains, the Kern County Planning and Natural Resources Department and follow the procedures and protocols set forth in Section 15064.5 (e)(1) of the CEQA Guidelines. The Lead Archeologist shall be notified and all construction activity shall immediately cease on the entire project. If the County coroner determines that the remains are Native American, the Native American Heritage Commission shall be notified, in accordance with Health and Safety Code Section 7050.5, subdivision (c), and Public Resources Code 5097.98 (as amended by AB 2641) for identification of the most likely Native American descendent. No construction activity may commence again until the Kern County Planning and Natural Resources Department has authorized such construction to begin after consultation with the Coroner and the most likely descendent - Native American Elder.

(21) The project proponent shall continuously comply with the following: In the event that unanticipated tribal cultural resources are encountered during the course of grading or construction, the project operator/contractor shall cease any ground disturbing activities within 50 feet of the find and contact the Lead Archaeologist for the project and the Kern County Planning and Natural Resources Department. Tribal cultural resources may include prehistoric archaeological materials such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock, as well as historic materials such as glass, metal, wood, brick, or structural remnants. A qualified archaeologist shall evaluate the resource and recommend appropriate treatment measures, as appropriate, to the Director of Planning and Natural Resources or designee. The project proponent shall implement such recommended measures if the Director of Planning and Natural Resources or her designee determines that they are feasible in light of project design, logistics, and cost considerations.

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 CEQA Guidelines Section 15126.4(b)(3)(C), if resources cannot be avoided, additional treatment measures shall be developed in consultation with the Director of Planning and Natural Resources or designee, and may include testing and evaluation or data recovery excavation. Kern County shall consult with appropriate Native American representatives in determining appropriate treatment for unearthed cultural resources if the resources are prehistoric or Native American in nature. 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.

(22) The project proponent shall comply with applicable seismic risk protection measures in the California Building Code, as confirmed with building permit plans submitted to the Kern County Public Works Department for review and approval.

(23) Prior to the issue of grading or building permits, the project proponent shall retain a qualified geotechnical engineer to provide any supplemental information required by the Kern County Public Works Department to the Geotechnical Report to address potential for localized liquefaction and soil conditions. The qualified geotechnical engineer shall observe earthwork and perform necessary tests and observations during subgrade preparation, proof-rolling, placement and compaction of controlled compacted fills, backfilling of excavations to the completed subgrade. The qualified geotechnical engineer shall confirm compliance with all site preparation requirements identified within the Geotechnical Report. Compliance documentation shall be provided to the Kern County Public Works Department.

(24) If any previously unknown oil, gas, or injection wells are discovered, work in the area of discovery shall be stopped and the Department of Conservation/Geologic Energy Management Division/Bakersfield office contacted by the project proponent to obtain information on the requirements of, and approval to perform, remedial operations implemented prior to resumption of work in the area of discovery.

(25) Prior to the issuance of grading or building permits, the project proponent shall prepare a Hazardous Materials Business Plan in accordance with the California Health and Safety Code and Kern County regulations and shall submit the plan to the Kern County Public Health Services Department for review and approval.

(26) The project proponent shall continuously comply with the following**:** All hazardous wastes shall be stored and properly managed in accordance with the approved Kern County Waste Management Department Hazardous Waste Exclusion Plan and hazardous materials business plan, until transported for proper disposal. A copy of the Hazardous Waste Exclusion Plan shall be submitted to the Kern County Planning and Natural Resources Department.

(27) Prior to the issuance of grading or building permits for the project, if herbicides are to be utilized, the contractor or personnel applying herbicides must have the appropriate State and local herbicide applicator licenses and comply with all State and local regulations regarding herbicide use. Herbicides shall be mixed and applied in conformance with the product manufacturer's directions. The herbicide applicator shall be equipped with splash protection clothing and gear, chemical resistant gloves, chemical spill/splash wash supplies, and material safety data sheets for all hazardous materials to be used. To minimize harm to wildlife, vegetation, and waterbodies, herbicides shall not be applied directly to wildlife, and products identified as non-toxic to birds and small mammals shall be used if nests or dens are observed. Herbicides shall not be applied if it is raining at the site, rain is imminent, or the target area has puddles or standing water, and shall not be applied when wind velocity exceeds 10 miles per hour. If spray is observed to be drifting to a non-target location, spraying shall be discontinued until conditions causing the drift have abated.

(28) Prior to issuance of grading or building permits, a project proponent shall obtain a review from the Kern County Fire Marshall and any approvals required for any deviations from the established

standards for storage of flammable and combustible liquids. The Fire Marshall may impose any conditions that are deemed necessary to safeguard public health and safety, and the determination shall be in writing and provided to the Kern County Planning and Natural Resources Department.

(29) The project proponent shall continuously comply with the following: If during grading or soil removal, evidence of petroleum products is discovered and appears to continue below the ground surface, construction activities in that area shall stop immediately and a qualified hazardous materials professional shall be contacted and brought to the project sites to make a proper assessment of the suspect materials. If applicable, remediation shall include removal of soil and proper disposal at an approved facility. Copies of all reports and correspondence shall be submitted to the Kern County Environmental Health Services Division/Hazardous Materials Section and the Kern County Planning and Natural Resources Department.

(30) The project proponent shall continuously comply with the following: If suspect materials or wastes of unknown origin are discovered during construction on the project site, which is thought to include hazardous waste materials, the following shall occur

(a) All work shall immediately stop in the vicinity of the suspected contaminant;
(b) Project Construction Manager shall be notified;
(c) Area(s) shall be secured as directed by the Project Construction Manager;
(d) Notification shall be made to the Kern County Environmental Health Services Division/Hazardous Materials Section for consultation, assessment and appropriate actions;
(e) Copies of all notifications and correspondence shall be submitted to the Kern County Planning and Natural Resources Department.

(31) Prior to grading or excavating, the Underground Service Alert on-call center shall be contacted at (800) 227-2600. The proposed excavation area shall be delineated with white marking paint or with other suitable markers such as flags or stakes at least two days prior to commencing any excavation work. A "Dig Alert" ticket number would be issued at the time Underground Service Alert is contacted. Excavating is not permitted without this ticket number and is valid for twenty-eight days. Underground Service Alert would notify its member utilities having underground facilities in the area. Underground Service Alert does not notify non-member utilities or energy companies, or Caltrans.

(32) Prior to the issuance of grading or building permits, the project proponent shall appoint an Emergency Response Liaison to coordinate the reduction of construction-related traffic for the duration of any emergency at or nearby the project site. The Kern County Fire Department, Kern County Sherriff's Department, and the California Highway Patrol shall be provided with the construction schedule and the on-site contact information for the Liaison prior to construction. The Liaison shall be immediately reachable at all times during project construction. The Liaison shall have radio contact with project construction vehicles at all times to coordinate traffic reduction measures. In addition, the Liaison shall coordinate with the Kern County Fire Department, the Kern County Sherriff's Department, and the California Highway Patrol to establish emergency procedures for access to the project site in the event of emergency during construction activities.

(33) All permanent power utilities extended to the project site shall be installed underground, where feasible as determined by the Kern County Planning and Natural Resources Director.

(34) The project proponent shall continuously comply with the following during construction

implementation of the project: In order to eliminate the risk of generating disease vectors at the site, during project construction, the project proponent 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 activities shall not generate standing water. The environmental monitor shall ensure that standing water and large quantities of trash do not accumulate onsite. Project compliance shall be verified by the Kern County Public Works Department during the course of that agency's performance of any on-site inspections.

(35) The use shall not generate noise that exceeds an average 65 dB Ldn (24-hour median) between the hours of 7:00 a.m. and 10:00 p.m., and shall not generate noise that exceeds 65 dB, or which would result in an increase of five (5) dB or more from ambient sound levels, whichever is greater, between the hours of 10:00 p.m. and 7:00 a.m. Noise level measurements shall be taken at the exterior of the closest residential dwelling within the boundary of the affected residential district(s) with sound level meter using an A-weighted network (scale) and, where practical, the microphone shall be positioned five (5) feet above the ground and away from reflective surfaces. Public complaints alleging violation of this standard may be required to submit documentation of actual noise level measurements. The Director of the Kern County Planning and Natural Resources Department, in consultation with the Kern County Public Health Services Department/Environmental Health Division, may authorize deviations or exceptions to the standards contained in this subsection and may require noise attenuation measures in conjunction with such authorization.

(36) The following shall be implemented by the project proponent during project construction:

(a) Project construction hours shall comply with Kern County Noise Ordinance as specified in Section 8.36.020. This includes, the construction contractor shall not receive deliveries or conduct engine warm-ups between 9 PM and 6 AM Monday through Friday and Between 9 PM and 8 AM Saturday and Sunday.

(b) The construction contractor shall locate on-site equipment staging areas so as to maximize the distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all construction.

(c) The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors. The nearest sensitive receptor is a hotel located approximately 0.25 miles east of the project site, and a single-family residence is located approximately 0.85 miles northeast.

(d) The construction contractor shall locate any pile drivers, or other machinery capable of causing strong vibrations or load noises, such that the rear of the vibratory pile driver or machinery faces toward the noise sensitive receptor when the machine is being utilized.

(e) The construction contractor shall ensure that "quiet" models of air compressors and other stationary construction equipment are utilized where such technology exists.

(f) The construction contractor shall ensure proper maintenance and working order of equipment and vehicles, and that all construction equipment is equipped with manufacturer's approved mufflers and baffles.

(g) The construction contractor shall prohibit unnecessary idling of internal combustion engines (i.e., in excess of five [5] minutes). The construction contractor shall ensure that the sound-control devices in all construction and impact equipment are at least as effective as the sound control devices installed in the original equipment at the time of purchase.

(37) Prior to the initiation of construction activity that qualifies for coverage under the California General Construction Permit, the project proponent shall comply with applicable permit coverage and notice requirements and construction-period management requirements, including the preparation and implementation of a stormwater pollution prevention plan (SWPPP) and the identification of erosion and sediment control options that meet applicable best available technology economically achievable and best conventional pollutant control technology (BAT/BCT) standards. During ground disturbance construction activities, the project proponent shall:

(a) Implement erosion control measures to prevent erosion from the construction site, including:

(1) physical soil stabilization using hydraulic mulch, soil binders, straw mulch, bonded fiber matrices, and erosion control blankets as appropriate;
(2) limiting the area and duration of exposure of disturbed soils to the extent feasible;
(3) soil roughening of graded areas through track walking, scarifying, sheepsfoot rolling, or imprinting;
(4) vegetation stabilization through temporary seeding; and
(5) applying water or other dust controls.

(b) Implement sediment control measures to prevent sedimentation impacts off the construction site, including:

(1) perimeter protection using silt fences, fiber rolls, gravel bag berms, sand bag barriers, or straw bale barriers, including the protection of environmentally sensitive areas;
(2) storm drain inlet protection;
(3) sediment capture using sediment traps, storm drain inlet protection, or sediment basins;
(4) velocity reduction using check dams, sediment basins, outlet protection, or velocity dissipation devices; and off-site sediment tracking controls using stabilized construction entrances and exits, construction road stabilization, or entrance and exit tire wash facilities.

(c) Implement waste and materials management measures to avoid unauthorized releases to and from the construction site, including measures to:

(1) avoid releases and control solid, sanitary, concrete, hazardous, and equipment-related wastes; and
(2) protect soil stockpiles using covers, water or soil binders, or perimeter control measures.

(d) Implement non-stormwater management measures to reduce or limit potential stormwater exposure to construction-related pollutants, including:

(1) water conservation practices;
(2) vehicle and equipment cleaning; and
(3) vehicle fueling practices that avoid and control pollutant discharges.

(e) Implement training and education measures, including:

(1) training individuals who are responsible for storm water pollution protection program preparation, implementation, and compliance, including construction contractors and subcontractors;
(2) providing signage that identifies storm water pollution protection program management requirements, such as site cleanup policies and designated washout locations; and
(3) disseminating construction-period water quality management measures and requirements to custom lot contractors prior to construction.

(f) Conduct maintenance, monitoring, and inspections as required to ensure compliance with construction-period water quality control measures, including:
  (1) regular site inspections and inspections before, during (for storm events greater than 24 hours in duration), and after storm events;
  (2) maintenance and repair of mitigation measures as required; and
  (3) preparation and implementation of a sampling and analysis plan for non-visible pollutants of concern.

(g) Implement a dry- and wet-weather control measures that include the following provisions:
  (1) dry-weather controls, including dust control, soil roughening of graded areas, sediment control measures at the down-gradient site perimeter and all operational storm drain inlets internal to the site, soil tracking mitigation, waste management and materials pollution control measures, non-stormwater measures to prevent or reduce stormwater contact with construction materials, and an action plan to deploy additional erosion and sediment controls as may be required within 48 hours of a predicted storm event; and wet-weather controls, including limiting the area and duration of exposure of disturbed soil areas, erosion and sediment control measures for disturbed areas, and maintaining sufficient on-site materials to implement additional erosion and sediment controls within 48 hours of a predicted storm event.

(38) Prior to receipt of an occupancy permit for the commercial structure, the project proponent or building permittee shall stencil a statement or graphical icon above publicly accessible storm drain system inlets that prohibits dumping improper wastes into the storm drain system and shall install inserts to collect trash from storm drain inlets in high-use areas of the site that include a standard curb and gutter system.

(39) The project proponent and the Rosedale-Rio Bravo Water Storage District shall comply with applicable requirements of the Sustainable Groundwater Management Act in managing any groundwater water resources made available to this project.

(40) Prior to issuance of any building permits or other development approvals, the project proponent shall provide written verification of compliance with applicable water efficiency design standards required by the California Uniform Building Code.

(41) The building permit applications shall include compliance with applicable water conservation state laws and regulations, and local ordinances, including but not limited to those applicable to interior fixtures, tankless water heaters, and low-flow plumbing, compliance with which shall be used to meet the required Maximum Applied Water Allowance for each land use.

(42) Prior to the issuance of a building permit, the project proponent shall comply with the following: The project proponent shall encourage all contractors of the project to hire, to the extent feasible, at least 50 percent of their workers from the local Kern County communities. The project proponent shall provide the contractors a list of training programs that provide skilled workers and shall require the contractor to advertise locally for available jobs, notify the training programs of job availability, all in conjunction with normal hiring practices of the contractor. The project proponent shall submit a letter detailing the hiring efforts prior to commencement of construction.

(43) Prior to the issuance of building permits, the project proponent shall prepare and submit a Construction Traffic Control Plan to Kern County Public Works 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 shall 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 as required; including, but not limited to: appropriate signage along access routes (Interstate 5 and Stockdale Highway) to indicate the presence of heavy vehicles and construction traffic;

(d) Determining the need for construction work hours and arrival/departure times outside peak traffic periods;

(e) Ensuring access for emergency vehicles to the project site;

(f) Temporary closure of travel lanes or disruptions to street segments and intersections during materials delivery, transmission line stringing activities, or any other utility connections;

(g) Maintaining access to adjacent property;

(h) Specification of both construction-related vehicle travel and oversize load haul routes, the minimization of construction traffic during the AM and PM peak hour, distributing construction traffic flow across alternative routes to access the project site, and avoiding residential neighborhoods to the maximum extent feasible; and

(h) Identification of vehicle safety procedures for entering and exiting site access roads.

(i) A traffic control coordinator shall be established. The traffic control coordinator shall be responsible for responding to any local complaints about project construction and operational traffic concerns. The traffic control coordinator shall determine the cause of the traffic complaint and shall be required to implement reasonable measures to resolve the complaint. Signs shall be posted along the project's construction and operations access routes and shall list the telephone number for the traffic control coordinator. The Construction Traffic Management Plan shall be subject to the review and approval of the Kern County Public Works Department. A copy of the plan shall be submitted to local emergency response agencies and transit providers as directed by Kern County, and to Caltrans. These agencies shall be notified at least 30 days before the commencement of construction that would partially or fully obstruct public roadways.

(44) Prior to the issuance of a building permit, the project proponent shall submit a Construction/Demolition Recycling Plan to the Kern County Public Works Department for review and approval. An onsite recycling coordinator shall be designated by the project applicant to facilitate recycling of all construction waste through coordination with the onsite contractor, local waste haulers, and/or other facilities that recycle construction/demolition wastes. The onsite recycling coordinator will also be responsible for ensuring that wastes requiring special disposal are handled according to state and County regulations that are in effect at the time of disposal. The name and phone number of the coordinator and the site plan for the disposal area shall be provided to the Kern County Public Works Department prior to the issuance of a grading permit. Additional measures to be included in the Plan include:

(a) Reducing the quantity of waste generated by construction activities (e.g., by using onsite spoils and bulk site-clearing materials for existing project needs, such as backfill, mulch,

erosion and sedimentation control), donating reusable materials to charitable organizations, or exporting materials for use in other construction projects;

(b) Maintaining a centralized information repository on site to identify which construction materials can be recycled and provide direction as to which sources will accept recyclable building and construction materials; and

(c) Requiring building or construction materials that are not recyclable to be taken to the nearest waste disposal facility. These materials shall be transported in bulk to reduce multiple truck trips, thereby reducing emissions generated from waste transportation.

(45) Prior to the issuance of any grading or building permit for the project, the project proponent shall provide a fenced storage area for recyclable materials that is clearly identified for recycling during construction activities. This area shall be maintained on the site during construction. A site plan showing the recycling storage area shall be submitted to the Kern County Planning and Natural Resources Department and Kern County Waste Management Department.

(46) Prior to the certificate of occupancy, the project proponent shall construct, subject to the review and approval of the Kern County Public Works Department, adequate, segregated, onsite screened storage for collection of commercial solid waste and source separated recyclable materials.

INCLUSION OF MITIGATION MEASURES AS PART OF PROJECT:

I, as applicant/authorized agent, have reviewed the mitigation measures noted above and agree to include said measures as part of this project.

Signed: _____ Dated: 9/28/2026

FINDINGS:

It has been found that this project, as described and proposed to be mitigated herein, will not have a significant effect on the environment and that an Environmental Impact Report (EIR) is, therefore, not required. A brief statement of reasons supporting such findings is as follows:

The proposed project would have a less than significant impact on energy, land use and planning, public services, transportation, utilities and service systems, and wildfire. However, the proposed project has the potential to result in a significant impact on aesthetics, air quality, cultural resources, biological resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, noise, and tribal cultural resources, due to possible disturbance of habitat or species during construction. However, with implementation of the included mitigation measures potential impacts would be minimized.

These measures will ensure that the project does not substantially degrade the quality of the environment, reduce habitat, or threaten any special-status species or plant communities. The project's impacts would not be cumulatively considerable when combined with other projects in the area, and it would not cause substantial adverse effects on human beings, either directly or indirectly. Therefore, with incorporation of mitigation, all potential impacts would be reduced to less than significant levels.

The project's incremental contribution to cumulative environmental impacts would not be cumulatively considerable. Projects within Kern County, including the proposed project, are evaluated for potential impacts and required to implement project-specific mitigation measures to reduce impacts to less than significant levels. All development must also comply with applicable County policies and ordinances.

The project will adhere to all permitting requirements and regulations of the Kern County Zoning Ordinance, the San Joaquin Valley Air Pollution Control District, the California Building Code, and the California Code of Regulations Fire Code. Compliance with these requirements ensures that the project does not contribute to cumulative impacts beyond those already anticipated in regional and local planning efforts.

Mitigation measures identified for aesthetics, air quality, cultural resources, biological resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, noise, and tribal cultural resources will further reduce project-level impacts to less than significant. When viewed in connection with past, present, and reasonably foreseeable future development, the project does not result in cumulatively considerable effects. Therefore, cumulative impacts would be less than significant**.**

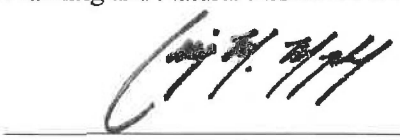
The project does not have the potential to cause substantial adverse effects on human beings, either directly or indirectly. The project site is in an area planned for industrial use, and all identified environmental impacts—such as air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, tribal cultural resources,—have been reduced to less than significant levels through compliance with existing regulations and standard conditions of approval. No substantial adverse effects on human beings are anticipated.

PUBLIC INQUIRY: Any person may object to dispensing with such EIR or respond to the findings herein. Information relating to the proposed project is on file in the office of the Planning and Natural Resources Department at the address shown below. Any person wishing to examine or obtain a copy of that information or this document, or seeking information as to the time and manner to so object or respond, may do so by inquiring at said office during regular business hours.

A copy of the Initial Study is attached hereto.

PROPOSED NEGATIVE DECLARATION DATE: September 30, 2026
NEGATIVE DECLARATION REVIEW PERIOD ENDS: October 29, 2026

CRAIG M. MURPHY, Director
Planning and Natural Resources Department



By Cindi Hoover, AICP
Assistant Director

Kern County Planning and
Natural Resources Department
2700 "M" Street, Suite 100
Bakersfield, CA 93301
(661) 862-8600

AGENCY CONSULTATION REQUIRED: X Yes ___ No

AGENCIES CONSULTED: Kern County Planning and Natural Resources Department/Current Planning; County Clerk; See notification list.

STATE CLEARINGHOUSE NUMBER (if required):

INITIAL STUDY PREPARED BY: April Wentworth, Planner II (661-862-5043), Kern County Planning and Natural Resources Department

DATE POSTED: September 30, 2026

DATE OF NOTICE TO PUBLIC: September 30, 2026

* Public Resources Code, Section 21000, et seq.
** Title 14, Division 6, California Administrative Code, as amended
*** Resolution No. 88-068, adopted January 19, 1988

CLH:AW (9/24/2026 – 5588.ND)

Attachment

INITIAL STUDY/ENVIRONMENTAL ANALYSIS
MITIGATED NEGATIVE DECLARATION

TO WHOM IT MAY CONCERN:

Pursuant to the California Environmental Quality Act of 1970 (CEQA),* the State CEQA Guidelines,** and the Kern County Guidelines for Implementation of CEQA and State CEQA Guidelines,*** the Kern County Planning and Natural Resources Department has made an Initial Study of possible environmental impacts of the following-described project:

APPLICANT: Gurdial Singh by LAV Consulting and Engineering (PP26128)

APPLICATION: (a) Precise Development Plan No. 19, Map No. 121; (b) Zone Variance No. 12, Map No. 121 (PLN25-00129)

LOCATION: Southwest corner of Stockdale Highway and Interstate 5, also being a portion of Section 6, Township 30 South, Range 25 East, MDB&M, County of Kern, State of California; Assessor's Parcel Number: 160-030-32.

DESCRIPTION OF PROPOSED PROJECT: (a) A Precise Development Plan to allow development of a 12,303-square-foot all-inclusive travel center with two (2) service stations, and 49 semi-truck parking spaces (Section 19.34.020.C.3, 4 and 5); and (b) A Zone Variance to construct a pole sign exceeding both the sign face and height maximum requirements (Section 19.34.110.A.7) in a CH PD (Highway Commercial – Precise Development Combining) District.

The project site consists of a 10.6-acre portion of a 26.41-acre parcel within the unincorporated portion of western Kern County. Approximately 2 acres of off-site roadway improvements would be provided along Stockdale Highway, Elk Valley Road and three new proposed public roadways. The site is zoned CH PD (Highway Commercial – Precise Development Combining) and is designated 6.3 (Highway Commercial) under the Kern County General Plan (Figure 1, Assessor's Parcelization Map, Figure 2, Existing Zone Classifications Map, and Figure 3, Existing General Plan Map, respectively).

Access to the site is provided from Stockdale Highway via Elk Valley Road (Figure 4, Aerial Map and Figure 5, Vicinity Map). Stockdale Highway is a major road classified as an arterial alignment (110-foot right-of-way) per the Kern County General Plan Circulation Element). Elk Valley Road is currently unimproved and is a major road classified as an arterial alignment (110-foot right-of-way) per the Kern County General Plan Circulation Element. Three new public roads would be developed as part of the project to provide multiple ingress and egress access points to the travel center.

The project site is located in the unincorporated area of Kern County that is not served by municipal sewage and is greater than 1,000 feet from a connection to municipal sewer. The project proponent proposes drilling a new water well to provide both fire flow and domestic water and proposes to construct a single onsite wastewater treatment system with a separate area for a septic system sized to serve the project. Separate water storage tanks will be constructed for both domestic and fire service. The required water storage for fire flow will be determined in consultation with the Kern County Fire Department.

The applicant is requesting land use approval of the following:

(a) Precise Development Plan to allow a 12,303-square-foot travel center to include a convenience store, a fast-food drive-thru restaurant with a limited dine-in area, one service station for standard vehicles

with 16 auto fuel pumps, a 9 bay semi-truck diesel fueling station with an associated semi-truck scale, 49 semi-truck parking spaces and 4 electric vehicle charging stations.

(b) A Zone Variance to construct a pole sign with a 300-square-foot sign face where a maximum 240-square-foot sign face is permitted and a 70-foot sign height where a maximum 35-foot sign height is permitted (Section 19.34.110.A.7) in a CH PD (Highway Commercial – Precise Development Combining) District.

The travel center will operate 24 hours a day, 7 days a week, with an anticipated 8-12 full-time employees per shift. The travel center includes an office, convenience store, food and beverage sales (including closed lid alcohol), and a fast-food restaurant with drive-thru and limited dine-in seating area. Additional services for long haulers include a small lounge with couches, televisions, a vending machine and a separate restroom with shower area. The site plan includes 49 truck parking spaces intended for short term and overnight use, including six electric truck charging stations and 105 passenger vehicle parking spaces including four electric vehicle (EV) charging stations. Above ground fuel storage tanks with a maximum storage capacity of 100,000 gallons of diesel and 100,000 gallons of gasoline would be located in the northern portion of the project site (Figure 6, Site Plan).

ENVIRONMENTAL SETTING: The project site consists of an approximately 10.6 acre portion of a 26.41 acre parcel and approximately 2 acres of offsite improvements and is located on the southwest corner of Stockdale Highway and Interstate 5. The project site has been historically used for grazing and is currently undeveloped. Surrounding properties are characterized primarily by active and fallow agricultural fields and vacant undeveloped land. Stockdale Highway and Interstate 5 southbound on-ramp directly abuts the site to the north, while Elk Valley Avenue abuts the site to the west and a portion of Interstate 5 southbound on ramp abuts the site to the east. Multiple undeveloped vacant commercial zoned parcels are located to the north, while areas to the south, east, and west are undeveloped vacant agriculturally zoned land. A similar hotel, fueling station and truck stop is located east of Interstate 5. The project site is located within the Kern County General Plan area. The City of Bakersfield jurisdictional limits are located 8 miles to the east of the project site along Stockdale Highway.

The project site and surrounding land uses are described in the following table:

Proposed Project Site and Surrounding Land Use

Direction	Existing Map Code Designation	Existing Zoning	Existing Land Use
Project Site	6.3 (Highway Commercial)	CH PD (Highway Commercial – Precise Development Combining)	Undeveloped vacant land
North	6.3 (Highway Commercial)	CH PD (Highway Commercial – Precise Development Combining)	Undeveloped vacant land
East	8.1 (Intensive Agriculture (Minimum 20 Acre Parcel Size))	A (Exclusive Agriculture)	Undeveloped vacant land
South	8.1 (Intensive Agriculture (Minimum 20 Acre Parcel Size))	A (Exclusive Agriculture)	Undeveloped vacant land
West	8.1 (Intensive Agriculture (Minimum 20 Acre Parcel Size))	A (Exclusive Agriculture)	Undeveloped vacant land

The project site is located within the southwestern portion of the San Joaquin Valley, north of the Kern River, at an elevation of 302 feet above mean sea level and the topography slopes to the northwest. The Temblor mountain range is located approximately 7 miles west of the project site and the Sierra Nevada mountain range is 40 miles east of the site. The project site does not contain any protected trees, rock outcroppings, or historic buildings and is not located near a scenic highway or designated scenic vista.

The project site and immediately adjacent lands are identified as Nonagricultural and Natural Vegetation by the California Department of Conservation Farmland Mapping Program. (California DOC, 2022) The project site is not located within the boundaries of a Kern County Agricultural Preserve and is not encumbered by a Williamson Act Land Use Contract. The site is not on or located in proximity to any forested lands.

The project is located within the geographic range of several federal and state listed threatened and/or endangered plant and animal taxa. Due to the site's undeveloped nature, the site may provide suitable habitat for numerous special status species, though no species were observed during biological pedestrian surveys (Appendix A). Special status species within the regional range include San Joaquin antelope squirrel, Tipton kangaroo rat, and blunt-nosed leopard lizard, which are unlikely to occur due to historical disturbance and surrounding land uses (Appendix A). No designated critical habitat occurs on the project site based on U.S. Fish and Wildlife Service mapping. Several non-listed, special-status species also have the potential to occur in the vicinity of the project. The federal and state database queries yielded 17 special-status plant species and 31 special-status animal species as potentially occurring with the vicinity of the project site. Of these, three (3) plant species, and 16 animal species have federal-, and/or state-listing and are afforded protection under federal or state law (Appendix A). No known wildlife migration corridors are present, and the site is not a native wildlife nursery site.

The project site does not contain any riparian habitat or other sensitive natural community or wetlands as defined by Section 404 of the Clean Water Act. The project is not located within an area of large bodies of open water, on or adjacent to the proposed project site.

The project site is located within the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD) and within the Kern County General Plan area. The project site is located within the Rosedale-Rio Bravo Water Storage District Groundwater Sustainability Agency.

California Geologic Energy Management Division (CalGEM) records indicate the site is located within the administrative boundaries of the Bowerbank Oil Field. However, no existing or historical oil wells or oil production facilities are located on the site. There are no known: (1) human remains or cemeteries; (2) unique paleontological resources or sites or unique geologic features; (3) historical resources; or (4) archaeological resources existing on the project site.

The project site is not located within an Earthquake Fault Zone. The nearest local fault to the project site is an unnamed fault located approximately four (4) miles south of the project site north of Highway 119, north of the city of Taft and west of the city of Bakersfield and is classified as a thrust fault which runs from the northeast to southwest direction. Two of the most notable faults in the area are the San Andreas Fault situated 50 miles to the west of the site and the White Wolf Fault situated 50 miles southeast of the site.

The project includes onsite storage and use of fuel. Specifically, it would include eight above-ground fuel tanks, enclosed within a designated containment area, with a total capacity of 100,000 gallons of diesel and 100,000 gallons of regular gasoline. Other potentially hazardous materials would include commonly used cleaners and solvents for the cleaning and maintenance of the travel center.

Figure 7 of the Circulation Element of the Kern County General Plan categorizes Stockdale Highway and Elk Valley Road as arterial (major highway) alignments. Figure 10 of the Circulation Element of the Kern

County General Plan identifies the nearest railroad to the project site is the Santa Fe Way Railway. The site is not located within any Specific Airport Sphere of Influence identified by the Kern County Airport Land Use Compatibility Plan. The nearest public airport is Buttonwillow Airport located, approximately eight (8) miles west of the project site and outside the administrative boundaries of the Kern County Airport Land Use Compatibility Plan.

The project is not located within a Flood Zone or within any designated floodplain hazard. The project will not be placed within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or FIRM or other flood hazard delineation map or place structures within a 100-year flood hazard area that would impede or redirect flood flows. The nearest water canal is the P-10 Canal which is located approximately 1 mile southeast of the project site.

Nonhazardous, municipal solid waste produced by the project would be collected by American Refuse for disposal at the Shafter-Wasco Sanitary Landfill. The project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

Fire protection is provided by the Kern County Fire Department, Buttonwillow Station 25 (100 Mirasol Avenue), located approximately 8 miles northwest of the project site. Police protection is provided by the Kern County Sheriff's Office, Battalion 02 (Substation north) located, approximately eight (8) miles northwest of the project site.

The project site is located within the Rio Bravo-Greeley Union School District and Kern High School Districts. The closest schools are Rio Bravo-Greeley School located approximately six (6) miles to the northeast, and Liberty High School located approximately 12 miles east of the project site. The project site is located within the Kern County Parks and Recreation District's notification area for all discretionary projects.

KERN COUNTY
ENVIRONMENTAL CHECKLIST FORM

Environmental Factors Potentially Affected:

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

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

DETERMINATION. (To be completed by the Lead Agency)

On the basis of this initial evaluation:

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

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

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

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

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

_____ _____

Signature Date

Kern County Planning and Natural Resources Department

April Wentworth, Planner II (661) 862-8043 For

Evaluation of Environmental Impacts:

(1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a Lead Agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

(2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

(3) Once the Lead Agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an Environmental Impact Report (EIR) is required.

(4) Negative Declaration: "Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The Lead Agency must describe the mitigation measure and briefly explain how they reduce the effect to a less than significant level.

(5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or Negative Declaration, Section 15063(c) (3) (D). In this case, a brief discussion should identify the following:

(a) Earlier Analysis Used. Identify and state where they are available for review.

(b) Impacts Adequately Addressed. Identify which effects from the above checklist where within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

(c) Mitigation Measures. For effects that are "Less Than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

(6) Lead Agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

(7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

(8) This is only a suggested form, and lead agencies are free to use different formats; however, Lead Agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

(9) The explanation of each issue should identify:

(a) The significance criteria or threshold, if any, used to evaluate each question.
(b) The mitigation measure identified, if any, to reduce the impact to less than significance.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS. Except as provided in Public Resources Code Section 21099, would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☐	☒	☐	☐

RESPONSES:

Response to (a) through (b): The project is located within an area that has historically been used for agricultural purposes. The project does not conflict with any applicable vista protection standards, scenic resource protection requirements or design criteria of federal, state, or local agencies. There are no scenic trees, rock outcroppings or historic buildings on the project site nor are there scenic highways or sensitive view corridors designated for the local region. Additionally, the Project would comply with sections 19.34.080 limiting height of buildings and 19.86 for minimum landscaping requirements and other development standards as provided in Zoning Ordinance (Title 19, Kern County Municipal Code). Therefore, the Project would have no impact on scenic vistas, state scenic highways or scenic resources of the Project site or its surroundings.

Response to (c): The horizon to the south and west are uninterrupted where mountain ranges such as the Caliente Range and San Emigdio Ranges are clearly visible. The project requests include a zone variance for a pole sign exceeding both the sign face and height maximum requirements. However, a "a balloon test" was

conducted and resulted in no significant degradation of the visual character or quality of public views from nearby public roadways. Therefore, development of the site, in accordance with County development standards, will not substantially degrade the existing visual character or quality of the site and its surroundings and impacts would be less than significant.

Response to (d): As proposed, the travel center will be used for the traveling public along the Interstate 5 travel corridor and will operate 24 hours a day, 7 days a week. Proposed mitigation measure would require parking area lights to be directed away from Interstate 5 or require a 4-foot wall or berm to prevent glare to oncoming traffic toward any surrounding streets and ensure new sources of light and glare do not adversely affect daytime or nighttime views or substantially impact adjacent properties or the public right-of-way, all parking areas and outdoor lighting shall comply with Chapter 19.81, the Kern County Dark Skies Ordinance. This requirement ensures lighting is hooded, arranged, and controlled so that light does not overflow to adjoining properties or public streets, thereby reducing potential light and glare impacts to a less-than-significant level with county development standards and mitigation incorporated.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
II. AGRICULTURE AND FOREST RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timber land, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

RESPONSES:

Response to (a) through (e): The project site is located in an area designated and developed for commercial use, not agriculture or forestry. The project parcel is not classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and is not under a Williamson Act contract or zoned for agricultural or timberland use. While the project site itself is not under a Williamson Act contract, property to the southwest is enrolled in the Williamson Act. The site and surrounding area lack forest resources, and conversion of Farmland or forest land would not occur as part of this proposal. The area is better suited for commercial development; therefore, the project would have no impact on agricultural or forestry resources.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☒	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☒	☐	☐

RESPONSES:

Response (a) through (d): The project is located near a major Interstate (I-5) and would be anticipated to serve travelers already travelling on the Interstate and would not be a new destination that would generate unplanned traffic. However, the Project site is located within the San Joaquin Valley Air Basin which is in non-attainment status for the federal 8-hour ozone standards and classified as serious nonattainment for fine particulate matter less than 2.5 microns in size (PM2.5). Under the California Ambient Air Quality Standards (CAAQS), the San Joaquin Valley Air Pollution Control District is designated nonattainment for ozone, PM10, and PM2.5. The nearest sensitive receptor, consisting of a single-family residence, is located approximately 0.87 miles east of the project site. Due to the project's location away from sensitive receptors and inclusion of proposed mitigation measures, operation of the Project would not expose individuals to substantial pollutant concentrations. The Project would not prevent implementation of any air quality plan, a net increase of any criteria pollutant under an applicable federal or state ambient air quality standard with implementation of proposed mitigation measures. Mitigation measures include signage to inform drivers of truck idling limits, EV charging stations for passenger vehicles and heavy-duty electric trucks, auxiliary power hookups for refrigerated trucks to eliminate overnight idling and compliance with all requirements of the San Joaquin Air Pollution Control District.

However, construction of the Project may generate fugitive dust (i.e. airborne dust particles that escape the project site) if not properly managed. Proposed mitigation measures would require the review and approval of a fugitive dust management plan prior to ground disturbing activities, ensuring that impacts related to

particulate matter are reduced to a less than significant level.

Valley Fever, or coccidioidomycosis, is caused by the microscopic fungus *Coccidioides immitis* (*C. immitis*), which grows in arid soil in parts of Kern County and other parts of America. Infection occurs when the spores of the fungus become airborne and are inhaled. Construction activities that disturb soils within the Project site could potentially release Valley Fever spores resulting in adverse health effects for construction workers or others exposed to the spores. Proposed mitigation measures would require implementation of Valley Fever training for all Project construction workers ensuring they are properly educated on the risks and safety protocols to reduce health risks related to Valley Fever exposure.

Although the Project could generate odors related to diesel engines, hydrocarbons or other emissions, no substantial population would occur on or near the site that would be adversely affected. Therefore, the project would have a less than significant impact related to air quality with the incorporation of mitigation measures.

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

RESPONSES:

PruettBio conducted a literature review (Appendix A) to identify known observations and potential for listed, or otherwise special-status species to occur in the vicinity of the project site. A standard, 10-mile (16 kilometer) radius query was performed. Database records reviewed included:

- United States fish & Wildlife Service (USFWS iPac)
- USFWS National Wetlands Inventory
- United Stated Department of Agriculture (USDA) WebSoil Survey
- California Natural Diversity Database (CNDDB-RareFind 5)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants

Additionally, a reconnaissance-level biological field survey was conducted on August 3, 2026. The project site was evaluated through a combination of perimeter surveys and random transects designed to evaluate all representative habitat features of the site. These methods provided complete visual coverage of the project area. Field documentation included observations of all plant and wildlife species observed during the survey. Both direct observations and indirect evidence (e.g., tracks, scat, or other sign) were recorded to evaluate the potential for species occurrence. Land cover classifications and general habitat conditions were documented and photographed. Any special-status species, sensitive vegetation communities, or notable habitat features (e.g., ephemeral drainage channels) observed during the survey were also recorded and photographically documented.

Coordinates for sensitive biological resources and any direct observations of special-status species were recorded using a handheld Global Positioning System (GPS) unit. All plant taxa encountered during the survey were identified to the extent practicable based on available diagnostic characteristics at the time of observation. Taxonomic identifications were conducted using keys from The Jepson Manual: Vascular Plants of California, along with current online updates reflecting revisions to accepted taxonomic treatments (Baldwin et al. 2012: Jepson Flora Project 2015).

The project site is located adjacent to an active orchard, intensive row crop agriculture, and Interstate 5. The surrounding areas were historically used for row crop farming, as evidenced by aerial imagery dating back to 1994. The site was historically used for grazing. The site is currently characterized by a mix of native and non-native vegetative cover.

Literature review and database queries identified 17 special-status plant species and 31 special-status wildlife species with potential to occur in the project vicinity. No special-status plant or wildlife species, or evidence thereof, were observed during the field survey. No protocol-level surveys were conducted. The field survey occurred outside the blooming period for many special-status plant species. An evaluation of special-status plant species with potential to occur in the region is provided in Appendix A.

Special-Status Plant Species

17 special-status plant species have potential to occur in the project vicinity, including three species listed as threatened or endangered under federal or state law. Special-status species were defined consistent with California Environmental Quality Act Section 15380 and California Department of Fish and Wildlife (2018) protocols, including federally and state-listed species, CNPS-listed taxa, and locally significant species. CNDDB, California Native Plant Society (CNPS), and U.S. Geological Survey data were cross-referenced for consistency. Although CEQA requires consideration of locally significant species, mitigation is not required for impacts to non-listed species. No listed, or otherwise special-status plant species was observed during the fieldwork conducted for the preparation of this report. No listed, or otherwise special-status plant species has been recorded as occurring within the project site.

Special-Status Animal Species

31 special-status wildlife species with potential to occur in the project vicinity, including 16 species listed under federal and/or state law. Special-status species considered include federally and state-listed species, candidates, species of special concern, and migratory birds protected under the Migratory Bird Treaty Act.

Due to the site's recovering habitat and proximity to undeveloped lands, the site could provide suitable habitat for Vernal pool fairy shrimp, Bakersfield legless lizard, California glossy snake, Blunt-nosed leopard lizard (BNLL), San Joaquin coachwhip, Coast horned lizard, Le Conte's thrasher, San Joaquin antelope squirrel, Giant kangaroo rat, Tipton kangaroo rat, Tulare grasshopper mouse, San Joaquin pocket mouse, American badger and the San Joaquin kit fox (SJKF). The site may provide suitable nesting or foraging habitats on the site for the Mountain plover, Western snowy plover, and Burrowing owl. Marginal habitat exists on the site for the Western spadefoot toad. No designated critical habitat occurs on the project site based on U.S. Fish and Wildlife Service mapping.

Impact Analysis

Potential impacts to biological resources were evaluated using the thresholds set forth in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. Appendix B (Special-Status Plant and Animal Evaluations) of the Biological Resources Evaluation supports the initial determination of impacts. The California Department of Fish and Wildlife (CDFW) and U.S. Fish and Wildlife Service (USFWS) were not consulted during preparation of this analysis. If project activities result in potential take of federally or state-listed species, coordination with the appropriate agency and applicable permits (e.g., Incidental Take Permit pursuant to Cal. Code Regs., tit. 14, § 783.2) may be required. The following analysis evaluates potential impacts of the proposed project relative to these thresholds and identifies measures, where necessary, to reduce impacts to less-than-significant levels.

Response to (a): Direct and indirect impacts, in the form of "incidental take" of a threatened, endangered, or otherwise protected species, are not expected as a result of the development of the proposed project. Implementation of proposed mitigation measures for the protection of biological resources are recommended to avoid and minimize potential impact to general wildlife.

The project is within the historic range of Tipton kangaroo rats. The project was included in the southwest focus area for the species in the previous habitat conservation plan at the northwestern edge. The project is ranked low to medium suitability for kangaroo rat habitat in CDFW's California Wildlife habitat Relationship system habitat suitability modeling (CWHR 2026). Small mammal trapping is recommended to confirm small mammal species occupying the project. The most recent habitat suitability modeling (Cypher) does not include the project in any of the four tiers enumerated for suitability and potential for occurrence of Tipton kangaroo rat is very low. Proposed mitigation measures requiring pre-construction surveys including small mammal trapping, biological resource monitoring during each initial phase of ground disturbance, worker environmental awareness program (WEAP) training, and management of construction materials and equipment would ensure special status wildlife species are not disturbed, entrapped or impeded during project construction. Proposed mitigation measures would reduce impacts to special status species to less than significant.

Response to (b): No 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 exists on the project site. No impact will occur as a result of the development of the proposed project, and no mitigation measures are recommended.

Response to (c): No features, identified in wetland categories, appear on the USFWS National Wetlands Inventory mapping (USFWS 2025) on the proposed, modified project site. No federally protected wetland as defined by Section 404 of the Clean Water Act were identified during the field study conducted for the preparation of Biological Resources report. No impact will occur as a result of the development of the project.

No mitigation measures are recommended.

Response to (d): No migratory wildlife corridors were identified during the literature search or field study. The project will not interfere substantially with the movement of any native fish of wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. However, construction of the project could impact nesting migratory birds and conflict with the Migratory Bird Treaty Act, if construction occurs during nesting season (generally February 1 through August 31). Proposed mitigation requires nesting bird surveys if ground disturbing activities would occur during the nesting season. Proposed mitigation would reduce impacts to nesting birds protected by the Migratory Bird Act to less than significant.

Response to (e): There are no biological resources on the site which are protected by local policies. Impacts from conflicts with local policies will not occur. No additional mitigation measures are recommended.

Response to (f): The project is not located within and does not conflict with any Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No impacts would occur and no additional mitigation measures are recommended.

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

RESPONSES:

Response to (a) through (c) : The project site is not located in an area determined to be highly or moderately sensitive for archaeological or historical resources (as per CEQA definitions). Pursuant to Assembly Bill (AB) 52, project information was routed to the Tejon Indian Tribe, Twenty-Nine Palms Band of Mission Indians, Yuhaaviatam of San Manuel Nation, Torres Martinez Desert Cahuilla Indians, and Morongo Band of Mission Indians, offering each an opportunity to consult under Public Resources Code (PRC) Section 21080.3(b) with a 30-day window to formally respond. No further inquiries were received by County staff.

The project site is not known to contain archeological or historical resources or human remains. Although no archeological or historical resources (as per CEQA definitions) have been documented on the proposed Project site, there is a potential that unrecorded cultural resources could be unearthed or otherwise discovered at the proposed Project site during ground-disturbing and construction activities. Buried or undiscovered prehistoric artifacts may be present within the proposed Project area. Due to the potential presence of buried prehistoric archaeological resources in the proposed Project area, the proposed Project could impact previously unknown, buried archaeological resources. Therefore, impacts are considered potentially significant. Proposed mitigation measures require a lead Archeologist to be retained prior to ground disturbing activities. The lead Archeologist would be responsible for preparing and implementing an Archeological Monitoring and Treatment Plan and conducting Cultural Resources Sensitivity Training for all construction personnel. Should cultural resources be encountered during grading or construction, all ground-disturbing activities within 50 feet of the find shall cease and Project proponent shall comply proposed mitigation measures.

Additionally, should human remains be discovered during construction, construction activities shall cease within 100 feet of the discovery and the Project proponent shall comply with proposed mitigation measures pursuant to Section 15064.5 (e)(1) of the CEQA Guidelines and in accordance with Health and Safety Code Section 7050.5, subdivision (c), and Public Resources Code 5097.98 (as amended by AB 2641). Incorporation and implementation of proposed mitigation measures would reduce potentially significant impacts related to

the inadvertent discovery of historical or archeological resources, or human remains to less than significant.

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

RESPONSES:

Response to (a) and (b): Project construction will require temporary energy demands typical of commercial projects that occur throughout the state and unusual project characteristics do not exist that would cause construction equipment to operate less efficiently than on comparable sites within the County. As a result, construction-related fuel use would not be inefficient, wasteful, or unnecessary. All new construction within the County jurisdiction must adhere to modern building standards, including California Building Standards Code – California Title 24, which outlines energy efficiency standards for new commercial buildings to ensure that they do not wastefully, inefficiently, or unnecessarily consume energy. As such, the project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

County of Kern does not have an adopted plan for renewable energy or energy efficiency. As mentioned above, all new development projects within the County are required to adhere to modern building standards related to energy efficiency. Energy consumption will occur during construction and operation; however, the proposed development is required to comply with current building code standards specifically, the California Uniform Building Code which requires state energy efficiency requirements and renewable energy goals. Therefore, the project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency, and impacts would be considered less than significant.

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

RESPONSES:

Response to (a. (i–iv)): The project site is located within the Tupman Quadrangle, a seismically active area of Kern County influenced by regional fault systems, including the San Andreas Fault. The nearest mapped fault is located approximately 13.5 miles from the project site within the Taft Quadrangle. The site has a moderate to high potential for strong seismic ground shaking, consistent with the southern San Joaquin Valley. Ground shaking intensity would vary based on the magnitude, distance, and depth of seismic events; however, the site is not located within a high fault rupture hazard zone, liquefaction hazard zone or landslide hazard zone. Compliance with applicable seismic design standards in the California Building Code (Title 24) would reduce the risk of structural damage, injury, or loss of life to less-than-significant levels.

Response to (b): Construction activities associated with the proposed project have the potential to result in soil erosion and loss of topsoil due to ground disturbance, grading, and vegetation removal. Without proper controls, these activities could expose soils to wind and water erosion. To reduce this impact, the project will be required to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will incorporate Best Management Practices (BMPs) to minimize erosion and sediment transport. Implementation of proposed mitigation measures requiring preparation of a SWPPP and associated BMPs would reduce potential impacts related to soil erosion and topsoil loss to less-than-significant levels.

Response to (c) and (d): The project site is located within the Tupman Quadrangle on relatively flat terrain. Based California Geological Survey and U.S. Geological Survey maps, the site is not located within a landslide hazard zone. The site is underlain by alluvial soils that may exhibit low to moderate liquefaction susceptibility under strong seismic shaking; however, the site is not within a designated Seismic Hazard Zone for liquefaction, and the site has negligible landslide potential due to its flat topography. Soils in the project area may exhibit moderate to high shrink-swell potential, indicating the presence of expansive soils. Compliance with site-specific geotechnical recommendations and the California Building Code (Title 24) would reduce potential impacts related to soil instability, liquefaction, and expansive soils to less-than-significant levels.

Response to (e): The proposed project would utilize an on-site septic system for wastewater disposal. Soils in the project area may have characteristics (e.g., clay content and shrink-swell potential) that could affect percolation and long-term septic system performance if not properly evaluated and designed. Septic systems are regulated by the Kern County Public Health Department, which requires site-specific soil evaluation, percolation testing, and system design in accordance with applicable local and state standards prior to permit approval. With implementation of proposed mitigation measure, impacts related to soils and septic systems would be reduced to less-than-significant levels.

Response to (f): The project area may contain previously undiscovered paleontological resources within subsurface soils. To minimize the risk of inadvertent impacts, the project would implement a Worker Environmental Awareness Program (WEAP) for all construction personnel. This program, prepared and conducted by a qualified archaeologist or paleontologist, would provide training on recognizing potential paleontological resources and proper procedures if resources are encountered during construction. Training would cover the types of fossils that could be present, applicable cultural and paleontological statutes, and required response measures, including immediate cessation of work within 50 feet of a discovery and notification of the qualified professional for evaluation. Only trained personnel wearing verification (e.g., hard hat stickers) would be permitted to operate equipment in the construction area. Documentation of training completion would be maintained and submitted to Kern County Planning and Natural Resources. With implementation of this program, the potential for the project to directly or indirectly destroy a unique paleontological resource or site would be reduced to less-than-significant levels.

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

RESPONSES:

Response to (a): The project would result in a limited increase in greenhouse gas (GHG) emissions during construction and routine operations. Construction-related emissions would be temporary and short-term, consisting primarily of exhaust from heavy-duty equipment, worker vehicle trips, and fugitive dust from ground disturbance. All construction activities would be required to comply with applicable federal, State, and local regulations governing construction practices and with proposed mitigation measures, including restrictions on equipment idling, proper maintenance of diesel equipment, and implementation of best management practices.

To minimize emissions associated with vehicle and equipment exhaust, the project shall limit construction equipment and on-road vehicle idling to no more than five minutes, consistent with California Air Resources Board (CARB) regulations. Additional measures include maintaining equipment in proper working condition, watering exposed surfaces, covering haul trucks, minimizing track-out, and phasing grading activities to reduce disturbed areas. These measures are consistent with applicable San Joaquin Valley Air Pollution Control District (SJVAPCD) requirements and standard practices to reduce emissions.
Operational emissions would be minimal and consistent with those generated by similar land uses, consisting primarily of vehicle trips and minor area sources. The project would also be required to comply with the California Building Standards Code Title 24, as adopted by the Kern County Building Code, including mandatory provisions of the California Green Building Standards Code, Part 11 and the Building Energy Efficiency Standards, Part 6. Mandatory CALGreen measures include construction waste diversion, water efficiency, indoor air quality standards, and resource-efficient materials. In addition, Title 24 energy efficiency standards require energy-efficient building systems, which reduce electricity and fuel consumption and thereby reduce indirect GHG emissions from energy generation.

Given the project's limited scale, temporary nature of construction emissions, and required compliance with regulatory standards designed to reduce GHG emissions, the project would not generate GHG emissions that would have a significant impact on the environment. Therefore, impacts would be less than significant.

Response to (b): The project does not include any components that would conflict with or impede implementation of applicable federal, State, regional, or local plans, policies, or regulations adopted to reduce greenhouse gas emissions. The project will be required to comply with all applicable regulatory requirements,

including State mandates enforced by the California Air Resources Board (CARB), such as anti-idling regulations and equipment standards designed to reduce emissions during construction and operation.

In addition, the project's compliance with the California Building Standards Code CCR Title 24, including mandatory CALGreen Part 11 and Building Energy Efficiency Standards Part 6, ensures consistency with statewide GHG reduction goals. These standards promote reduced energy consumption, improved building efficiency, and lower associated emissions, which align with the objectives of State climate policies, including those aimed at reducing overall greenhouse gas emissions.

Compliance with applicable San Joaquin Valley Air Pollution Control District (SJVAPCD) rules further ensures that construction-related emissions are minimized and consistent with regional air quality and GHG reduction strategies.

Because the project is required to comply with these existing regulatory frameworks and does not propose any features that would conflict with adopted GHG reduction plans or policies, the project would not conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions. Therefore, impacts would be less than significant.

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

RESPONSES:

Response to (a): The proposed project includes typical commercial uses associated with a truck stop, including the storage and use of fuels and limited hazardous materials. Specifically, the project would include approximately 100,000 gallons of aboveground gasoline storage, 100,000 gallons of aboveground diesel storage. All hazardous materials would be stored, handled, and transported in accordance with applicable federal, State, and local regulations, including requirements enforced by the Kern County Environmental Health Division and fire code standards. These regulations govern proper containment, spill prevention, and emergency response procedures, thereby minimizing the potential for adverse impacts. Further, proposed mitigation measures require a Hazardous Materials Business Plan (HMBP) be submitted to ensure hazardous materials stored onsite are done in a safe manner. Given implementation of proposed mitigation measures, regulatory compliance and standard industry practices, routine transport, use, and disposal of hazardous materials would not create a significant hazard to the public or environment. Therefore, impacts would be less than significant with implementation of mitigation.

Response to (b): Potential upset conditions could include accidental fuel spills or leaks from storage tanks or during fuel transfer operations. However, the project would be required to incorporate spill prevention and control measures, including secondary containment systems and compliance with applicable hazardous materials management plans. Additionally, the project site is not located near densely populated or highly sensitive receptors. The nearest sensitive receptor is a hotel located approximately 0.35 miles southeast of the project site, and a single-family residence is located approximately 0.87 miles east. These distances reduce the potential for exposure in the unlikely event of an accidental release. Further, proposed mitigation measures require preparation and submittal of a HMBP which would ensure procedures are in place in the event of an upset. With adherence to regulatory requirements and standard safety practices, the likelihood and severity of accidental releases would be low and would not result in significant hazards. Therefore, impacts would be less than significant.

Response to (c): The project site is not located within one-quarter mile of an existing or proposed school. The closest schools are Rio Bravo-Greeley Elementary School located approximately six (6) miles to the northeast, the closest middle school is Rio Bravo-Greeley School located six (6) miles to the northwest, and Liberty High School is located approximately 12 miles east of the project site. Therefore, the project would not expose students or school personnel to hazardous emissions or the handling of hazardous materials. Therefore, there would be no impact.

Response to (d): The project site is not identified on any list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 (Cortese List). As such, development of the site would not create a hazard to the public or environment related to known contamination. Therefore, there would be no impact.

Response to (e): The project site is not located within an airport land use plan or within a designated airport influence area. The nearest public airport is Buttonwillow Airport, located approximately eight (8) miles west of the project site and outside the administrative boundaries of the Kern County Airport Land Use Compatibility Plan. Due to this distance, the project would not be subject to airport-related safety hazards or excessive aircraft noise affecting people working at the site. Therefore, there would be no impact.

Response to (f): Kern County has an adopted Emergency Operations Plan that establishes countywide coordinated emergency response procedures, roles, communications, and operational protocols under California's Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS). The proposed project would not impair or physically interfere with the implementation of any adopted emergency response or evacuation plan. The project is located adjacent to Interstate 5 and near Stockdale Highway, both of which are major transportation corridors that would continue to function as

regional emergency access and evacuation routes. The project design would be required to comply with applicable access and circulation standards to ensure adequate emergency vehicle access. Therefore, impacts would be less than significant.

Response to (g): The project site is located within a Local Responsibility Area and is not within a State Responsibility Area for wildland fire. The site is designated as a Moderate (-3) Fire Hazard Severity Zone and is considered a non-wildland area. Surrounding land uses are largely agricultural and commercial, with limited wildland. Additionally, the distance to sensitive receptors (approximately 0.35 miles to a hotel and 0.87 miles to a residence) and the developed nature of the site reduce the potential for wildfire-related risks. The project would also be required to comply with applicable fire codes and defensible space requirements. Therefore, impacts related to wildland fire risk would be less than significant.

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

RESPONSES:

A Groundwater Mounding and Nitrate Loading Report (Appendix B) was prepared by Mark R. Magargee, PG, CHG, Consulting Hydrogeologist. The report incorporates a review of regional hydrogeologic data, site-specific soil and permeability information, and established groundwater modeling methods to evaluate potential changes in groundwater levels and nitrate concentrations associated with the proposed onsite wastewater treatment system. These analyses provide the technical basis for assessing whether the project could affect groundwater recharge, groundwater supply, or overall basin sustainability.

Response to (a): The proposed project would not violate water quality standards, degrade surface or groundwater quality, or conflict with waste discharge requirements. The project will be required to comply with applicable stormwater regulations, including incorporation of surface drainage design features that direct runoff to approved collection and treatment facilities. Proposed mitigation measures require preparation of a Stormwater Pollution Prevention Plan (SWPPP). With these standard measures and proposed mitigation, impacts would be less than significant.

Response to (b): The project would not substantially decrease groundwater supplies or interfere with groundwater recharge. Any increase in impervious surfaces would be managed through required drainage improvements that maintain appropriate on-site runoff controls. The project site is located within the Rosedale-Rio Bravo Water Storage District Groundwater Sustainability Agency (GSA), which does not allocate groundwater to individual landowners; therefore, the project is consistent with the district's policies. The applicant will be required to install a flow meter and provide Rosedale and the Rosedale GSA reasonable access to the meter to monitor the amount groundwater extracted from the well and /or used on the property. Proposed mitigation measures require the project proponent to obtain a water well permit from the Kern County Public Works Department, Environmental Health Division, prior to the installation and operation of the on-site well.

Based on the groundwater mounding and nitrate loading analyses, the proposed onsite wastewater treatment system (OWTS) would not substantially decrease groundwater supplies or interfere with groundwater recharge. Groundwater beneath the site is more than 150 feet below grade, and the mounding model shows operation of the OWTS would result in a maximum groundwater rise of approximately 1.8 feet. This small increase does not alter groundwater elevations in a way that would affect aquifer conditions or basin sustainability. The required separation to groundwater is maintained, and no change in recharge patterns or groundwater flow regime is expected. The nitrate loading study shows wastewater infiltrating from the OWTS will dilute within a thick alluvial aquifer and will not exceed the regulatory nitrate-nitrogen limit of 10 mg/L under either realistic, worst-case, or cumulative conditions. Because nitrate concentrations remain well below thresholds, groundwater quality is not degraded in a manner that could interfere with local groundwater management or supply reliability. Overall, the project's wastewater discharge volume is small compared to the depth and size of the aquifer, does not measurably affect groundwater quantity, and does not impede recharge or sustainable groundwater management. Accordingly, impacts to groundwater resources would be less than significant with implementation of mitigation.

Response to (c): The project would not substantially alter existing drainage patterns in a manner that would cause erosion, siltation, flooding, exceed the capacity of stormwater systems, generate polluted runoff, or impede or redirect flood flows. Required surface drainage design, including sloped grading away from structures, controlled discharge locations, and compliance with County drainage standards, will ensure runoff is properly managed. As a result, all drainage-related impacts would be less than significant.

Response to (d): The project site is not within a tsunami or seiche zone and is not expected to be subject to flood-related pollutant release. Compliance with applicable drainage and stormwater requirements would

further ensure that pollutant release risks remain less than significant.

Response to (e): See *Response to (b)*. The project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan; therefore, the project impacts would remain less than significant.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XI. LAND USE AND PLANNING. Would the project:				
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?	☐	☐	☒	☐

RESPONSES:

Response to (a) and (b): The project will not physically divide an established community or create any conflict with a land use plan, policy, or regulation adopted to avoid or mitigate environmental effects. Additionally, the project does not conflict with any applicable land use plan, policy, or regulation of agencies with jurisdiction over the site. The project site is designated Highway Commercial under the Kern County General Plan, and the proposed development complies with this designation and is consistent with surrounding community land uses. Therefore, the project would have a less than significant impact related to land use and planning.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

RESPONSES:

Response to (a) and (b): The project is not designated for resource recovery by the Kern County General Plan, or other land use plans, and will not result in the loss of availability of a known mineral resource that would be of value to the state or loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. Therefore, it will have no impact relating to mineral resources.

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

RESPONSES:

Response to (a): The project site is located adjacent to Interstate 5, which is a dominant and continuous source of ambient noise in the project vicinity. Surrounding land uses are primarily rural, agricultural, and undeveloped properties, with limited noise-sensitive receptors. The nearest sensitive receptor is a hotel located approximately 0.35 miles southeast of the project site, and a single-family residence is located approximately 0.87 miles east.

The proposed truck stop and associated uses would generate operational noise from truck and passenger vehicle circulation, idling, and related activities. While truck stops are inherently noise-generating, the project would be required to comply with applicable standards in the Kern County Zoning Ordinance, Section 19.80.030.S. Given the existing elevated ambient noise environment associated with Interstate 5 and the separation distances to the nearest sensitive receptors, project-generated operational noise is not expected to result in a substantial increase in ambient noise levels at off-site receptors or exceed applicable standards.

Short-term construction activities would result in a temporary increase in noise and traffic in the surrounding area. However, construction noise would be intermittent and limited in duration and would occur within an area characterized by agricultural, industrial and commercial uses where such noise is typical and generally compatible. Compliance with Kern County noise regulations and proposed mitigation measures would ensure that temporary impacts remain less than significant. Therefore, impacts related to the generation of temporary and permanent noise would be less than significant with implementation of mitigation.

Response to (b): The proposed project would involve typical commercial construction activities and operation of a truck stop facility. These activities do not include the use of heavy vibration-inducing equipment (e.g., pile driving) on a sustained basis, nor would operations generate substantial ground-borne vibration. Operational activities such as truck movement and idling are not expected to produce vibration levels that

would be perceptible at the nearest sensitive receptors due to the distance from the site. Compliance with Kern County regulations would further ensure any temporary construction-related vibration is minimized. As such, the project is not anticipated to generate excessive ground-borne vibration or ground-borne noise. Therefore, impacts would be less than significant.

Response to (c): The project site is not located within an airport land use plan area, nor is it within the vicinity of a private airstrip. The nearest public airport is Buttonwillow Airport, located approximately eight (8) miles west of the project site, which is outside the administrative boundaries of the Kern County Airport Land Use Compatibility Plan. Due to the substantial distance from the nearest airport and absence of overflight activity affecting the project site, the project would not expose people residing or working in the area to excessive noise levels. Therefore, impacts related to airport noise would be less than significant.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. POPULATION AND HOUSING. Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the constriction of replacement housing elsewhere?	☐	☐	☐	☒

RESPONSES:

Response to (a) and (b): The project is along a travel corridor in a commercially zoned area and will not induce substantial unplanned population growth in the area or displace substantial numbers of existing people or housing, to necessitate housing elsewhere. Therefore, it will have no impact relating to population and housing.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. PUBLIC SERVICES. Would the project:				
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:				
Fire protection?	☐	☐	☒	☐
Police Protection?	☐	☐	☒	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other public facilities?	☐	☐	☒	☐

RESPONSES:

Response to (a): The project will not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or need for new or physically altered governmental facilities impacting response time for or performance objectives for fire protection, police protection, schools, parks, or other public facilities.

Fire protection services are provided by the Kern County Fire Department, with the nearest facility being Buttonwillow Station 25, located approximately 8 miles northwest of the project site. The project site and surrounding area are classified as a Moderate (-3) Fire Hazard Severity Zone (FHSZ) within a Local Responsibility Area (LRA) and are considered non-wildland. The proposed truck stop would not substantially increase population or introduce land uses that would materially alter existing demand for fire protection services beyond typical commercial development. The project would be required to comply with all applicable fire codes, including access, water supply, and fire flow requirements, which are designed to maintain acceptable service ratios and response performance. Given the scale and nature of the project, and its location within an already served area, implementation would not require the construction of new or expanded fire protection facilities.

Police protection is provided by the Kern County Sheriff's Office, with the nearest substation (Battalion 02 – Substation North) located approximately eight (8) miles northwest of the project site. The project would not introduce a residential population and would not be expected to substantially increase demand for law enforcement services beyond routine levels associated with commercial uses. The operational characteristics of the project are consistent with uses already served by existing law enforcement infrastructure. As such, the project would not require new or physically altered police facilities to maintain acceptable response times or

service ratios.

The proposed Project is a commercial truck stop and would not introduce a residential population. As such, the project would not generate additional student enrollment or increase demand for school facilities. Furthermore, any applicable development would be subject to statutory school impact fees, which are intended to address cumulative impacts on school facilities.

The project would not generate a permanent residential population or increase demand for neighborhood or regional parks. The proposed Project would not create a need for new or expanded park facilities. Additionally, any applicable development would be subject to Quimby Act requirements, which ensure that parkland or in-lieu fees are provided to maintain service standards.

The project would not result in a substantial increase in population or demand for other public services such as libraries or community centers. The scale and nature of the project are consistent with existing commercial and industrial uses in the area, and it would be adequately served by existing public facilities without requiring expansion or construction of new facilities.

The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities. Impacts to public services would be less than significant.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

RESPONSES:

Response to (a) and (b): The project will not increase the use of existing neighborhood and regional parks or other recreational facilities and does not include recreational facilities or require the construction or expansion for recreational facilities which might have an adverse physical effect on the environment. Therefore, it will have no impact relating to recreation.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII. TRANSPORTATION. Would the project:				
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Conflict or be inconsistent with CEQA Guidelines Section § 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersection) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d) Result in inadequate emergency access?	☐	☐	☒	☐

RESPONSES:

Response to (a) through (d): The applicant provided a Traffic Impact Study completed by LAV//Pinnacle Consulting & Engineering Services, dated November 1, 2023. The Traffic Impact Study was reviewed by the Kern County Public Works Development Review Department and it was determined the project does not conflict with a program plan ordinance or policy addressing the circulation system, and does not conflict with CEQA guidelines Section § 15064.3, subdivision (b) or result in inadequate emergency access. Subsequent to preparation of the Traffic Impact Study, the project was revised to reduce project size and intensity, reducing the number of anticipated trips generated by the project on Stockdale Highway and Elk Valley Road. As presented, the project design would potentially increase hazards due to a geometric design feature due to an access driveway at the Kuki Street and Singh Road right-angle curve. Proposed mitigation measures would require the final design to eliminate the access drive located at Kuki Street and Singh Road. Therefore, it will have a less than significant impact relating to transportation.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. TRIBAL CULTURAL RESOURCES.				
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section5020.1(k), or	☐	☒	☐	☐
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

RESPONSES:

Response to (a): The project site is not located in an area determined to be highly or moderately sensitive for tribal cultural resources. Pursuant to Assembly Bill (AB) 52, project information was routed to the Tejon Indian Tribe, Twenty-Nine Palms Band of Mission Indians, Yuhaaviatam of San Manuel Nation, Torres Martinez Desert Cahuilla Indians, and Morongo Band of Mission Indians, offering each an opportunity to consult under Public Resources Code (PRC) Section 21080.3(b) with a 30-day window to formally respond

(Figure 7, Tribal Consultation Vicinity Map). No requests or consultation were received. If any previously unknown archaeological or cultural resources are discovered, proposed mitigation measures would require work in the area of discovery to cease and a qualified archaeologist contacted to evaluate the find. A copy of the archaeologist's evaluation shall be submitted to the Kern County Planning and Natural Resources Department upon its issuance, and any measures recommended by the archaeologist shall be implemented before work resumes in the area of discovery. Further, proposed mitigation measures require compliance with Health and Safety Code Section 7050.5, subdivision (c), and Public Resources Code 5097.98 (as amended by AB 2641) if human remains are discovered during ground disturbing activities. With implementation of proposed mitigation measures, any potential impact to tribal cultural resources would be reduced to less than significant.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIX UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

RESPONSES:

Response to (a): As a new development, the Project would require standard utility connections for water, wastewater, stormwater drainage, electric power, natural gas, and telecommunications. These improvements would be limited to on-site infrastructure and typical service extensions. Utility providers have confirmed their ability to serve the Project, and no off-site expansions, major new facilities, or relocation of existing infrastructure would be required. The septic system is adequately sized, and the groundwater mounding study confirms it will operate as intended without requiring new or expanded off-site wastewater facilities. Therefore, the Project would not result in the need for new or expanded utility systems that could cause significant environmental effects.

Response to (b): The project site is located within the Rosedale Rio-Bravo Water Storage District and the

Rosedale Rio-Bravo Water Storage District Groundwater Sustainability Agency (GSA). The GSA has confirmed only that the proposed use of groundwater for the project is consistent with the current Groundwater Sustainability Plan (GSP) prepared under the Sustainable Groundwater Management Act (SGMA). The GSA retains full authority to regulate, limit, or suspend groundwater extraction, and neither the District nor the GSA guarantees the availability of groundwater, the ability to extract groundwater, or the maintenance of groundwater levels or quality.

The property owner will be required to install a flow meter on any well serving the project site and to provide the District and the Groundwater Sustainability Agency (GSA) access for monitoring to ensure compliance with SGMA requirements. The property owner also agrees to provide Rosedale with an easement for a future pipeline connection to existing infrastructure located in proximity to the property. Because the project's groundwater use falls within the parameters of the adopted Groundwater Sustainability Plan (GSP) and is subject to ongoing GSA oversight, the project would not substantially deplete groundwater resources or conflict with groundwater management efforts. Therefore, impacts related to water supply reliability would be less than significant.

Response to (c): The project would not result in a determination by a wastewater treatment provider regarding available capacity because the applicant proposes to utilize a private on-site wastewater treatment system and leach field. As no connection to a public wastewater treatment provider is required, the project would not affect the provider's existing commitments or capacity. Therefore, impacts would be less than significant.

Response to (d): The project would not generate solid waste in excess of State or local standards or beyond the capacity of local solid waste infrastructure. The applicant proposes utilizing a private on-site wastewater treatment system and leach field, which reduces reliance on public wastewater facilities and does not contribute to solid waste generation. Solid waste produced during construction and operation would be typical of comparable development and would be accommodated by existing regional waste management services. Therefore, impacts related to solid waste generation, and solid waste reduction goals would be less than significant.

Response to (e): The project will comply with all applicable federal, State, and local solid waste regulations, including waste diversion requirements. As a result, solid waste–related impacts would be less than significant**.**

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XX. WILDFIRE. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

Response to (a) through (d): The project would not impair or interfere with any adopted emergency response or evacuation plans. The site is in an area with minimal slope and is not within or adjacent to a State Responsibility Area or Very High Fire Hazard Severity Zone. Project implementation would not exacerbate wildfire risks due to slope, prevailing winds, or other environmental factors, nor would it expose occupants to pollutant concentrations from a wildfire. Additionally, the project does not include or require the installation or maintenance of infrastructure that could increase fire risk or result in ongoing environmental impacts. All County-required development standards, including road improvements or any other conditions of approval, will be implemented as part of the project, thereby ensuring adequate access and compliance with applicable safety requirements. The project site is not subject to conditions that would expose people or structures to flooding, landslides, or post-fire slope instability. Therefore, it will have no impacts related to wildfire hazards or emergency response.

Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XXI. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

RESPONSES:

Response to (a): The proposed project has the potential to result in a significant impact on biological and cultural resources due to possible disturbance of habitat or species or inadvertent discovery of archeological resources during construction. However, with implementation of the included mitigation measures potential impacts would be minimized.

These measures will ensure that the project does not substantially degrade the quality of the environment, reduce habitat, or threaten any special-status species or plant communities. Further, the proposed mitigation measures would ensure the protection of archeological resources if they are inadvertently uncovered during construction. Therefore, with incorporation of mitigation, all potential impacts would be reduced to less than significant levels.

Response to (b): The project's incremental contribution to cumulative environmental impacts would not be cumulatively considerable. Projects within Kern County, including the proposed project, are evaluated for

potential impacts and required to implement project-specific mitigation measures to reduce impacts to less than significant levels. All development must also comply with applicable County policies and ordinances.

The project will adhere to all permitting requirements and regulations of the Kern County Zoning Ordinance, the San Joaquin Valley Air Pollution Control District, the California Building Code, and the California Code of Regulations Fire Code. Compliance with these requirements ensures that the project does not contribute to cumulative impacts beyond those already anticipated in regional and local planning efforts.

Mitigation measures identified for Air Quality, Geology and Soils, Noise and Transportation will further reduce project-level impacts to less than significant. When viewed in connection with past, present, and reasonably foreseeable future development, the project does not result in cumulatively considerable effects. Therefore, cumulative impacts would be less than significant.

Response to (c): The project does not have the potential to cause substantial adverse effects on human beings, either directly or indirectly. The project site is in an area planned for industrial use, and all identified environmental impacts—such as air quality, noise, traffic, and geologic hazards—have been reduced to less than significant levels through compliance with proposed mitigation measures, existing regulations and standard conditions of approval. No substantial adverse effects on human beings are anticipated with implementation of mitigation; therefore all potential impacts would be reduced to less than significant.

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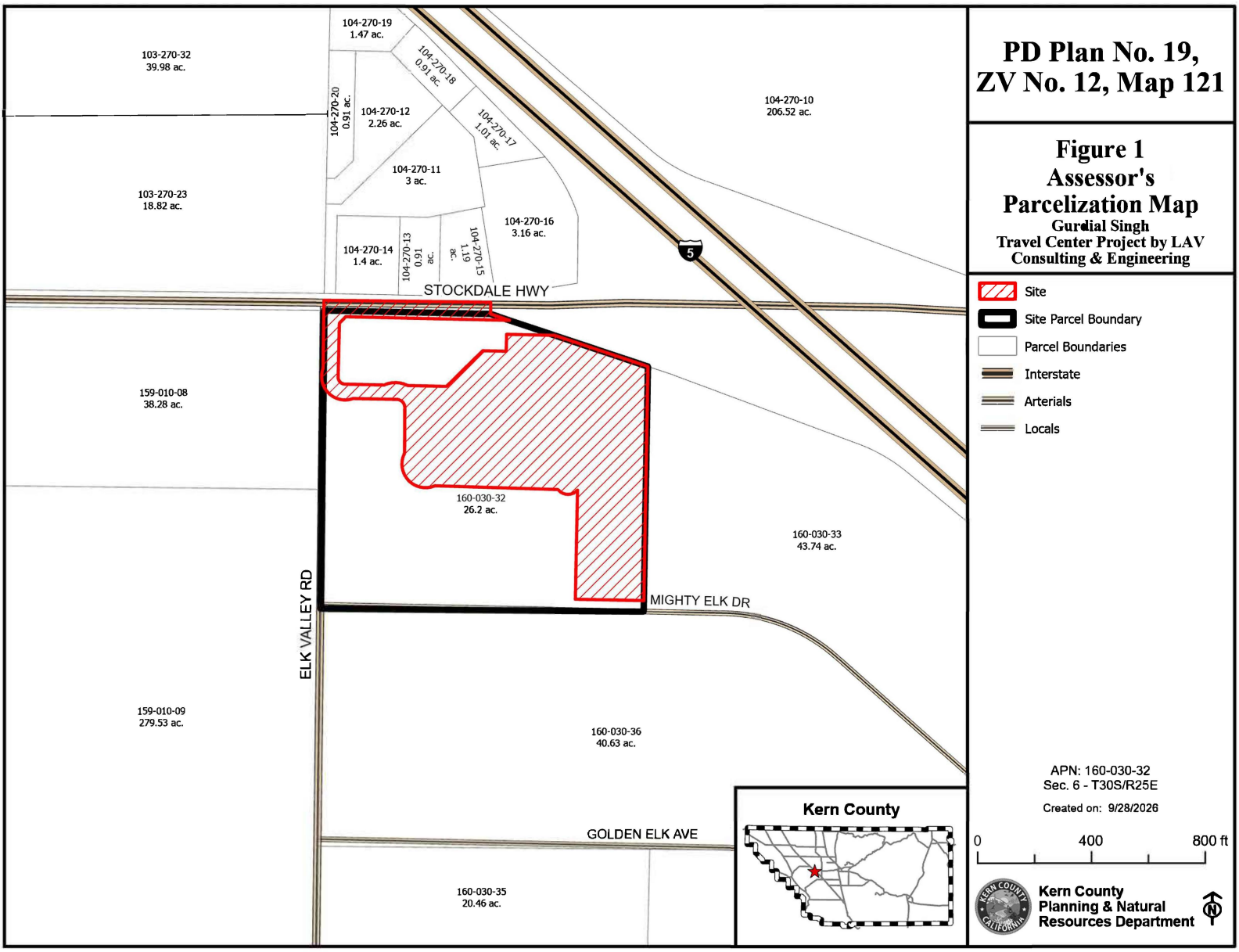
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5
STOCKDALE HWY
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160-030-32
26.2 ac.
160-030-33
43.74 ac.
MIGHTY ELK DR
ELK VALLEY RD
159-010-09
279.53 ac.
160-030-36
40.63 ac.
GOLDEN ELK AVE
160-030-35
20.46 ac.
Kern County
PD Plan No. 19,
ZV No. 12, Map 121
Figure 1
Assessor's
Parcelization Map
Gurdial Singh
Travel Center Project by LAV
Consulting & Engineering
Site
Site Parcel Boundary
Parcel Boundaries
Interstate
Arterials
Locals
APN: 160-030-32
Sec. 6 - T30S/R25E
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Resources Department
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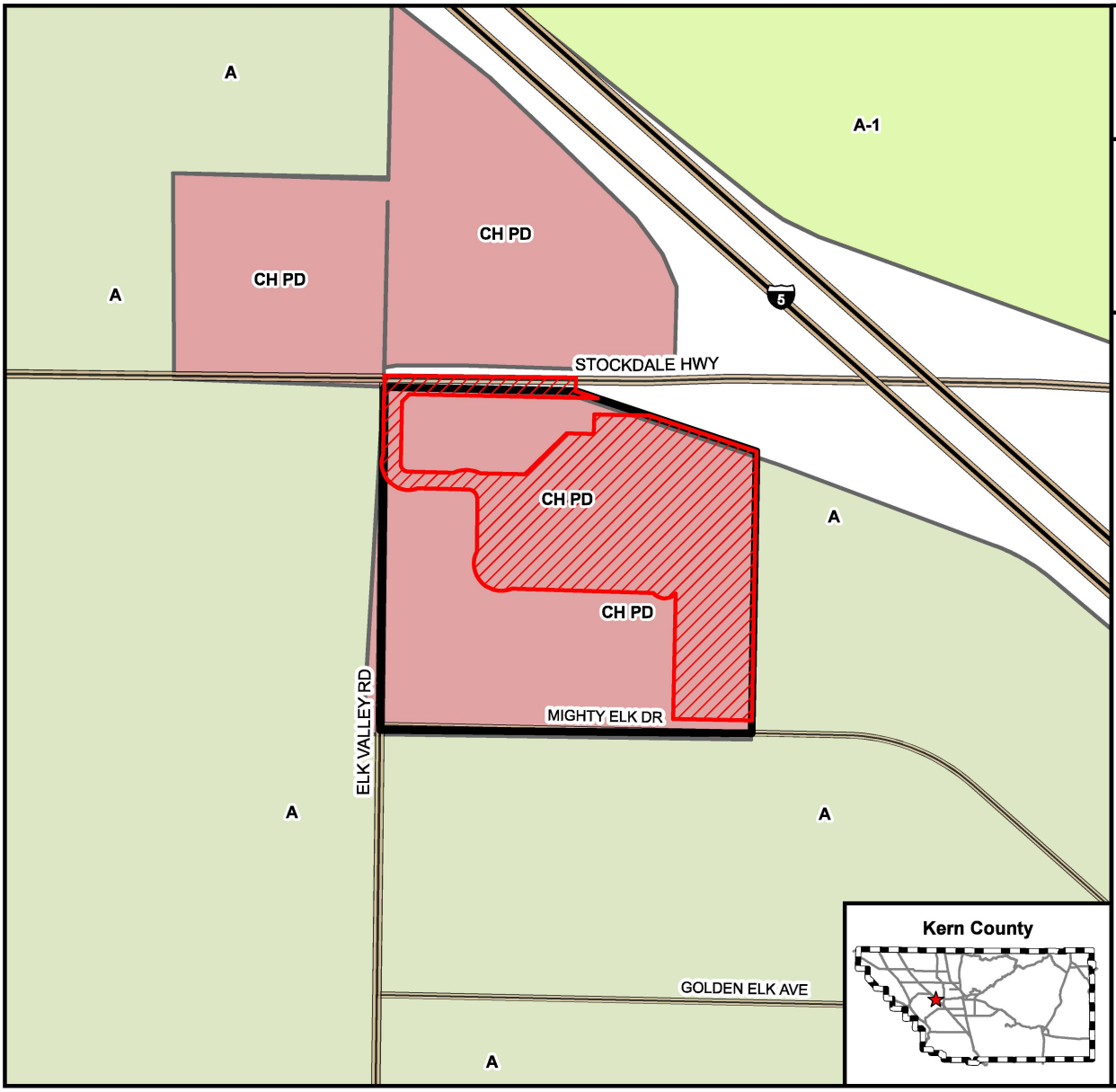

PD Plan No. 19, ZV No. 12, Map 121

Figure 2 Existing Zone Classifications

Gurdial Singh Travel Center Project by LAV Consulting & Engineering

- Site
- Site Parcel Boundary
- Interstate
- Arterials
- Locals

KERN COUNTY ZONING DESIGNATIONS

- A - Exclusive Agriculture
- A-1 - Limited Agriculture
- CH - Highway Commercial
- PD - Precise Development Combining

APN: 237-031-08, 237-031-38
Sec. 16 - T11N/R13W

Created on: 9/29/2026

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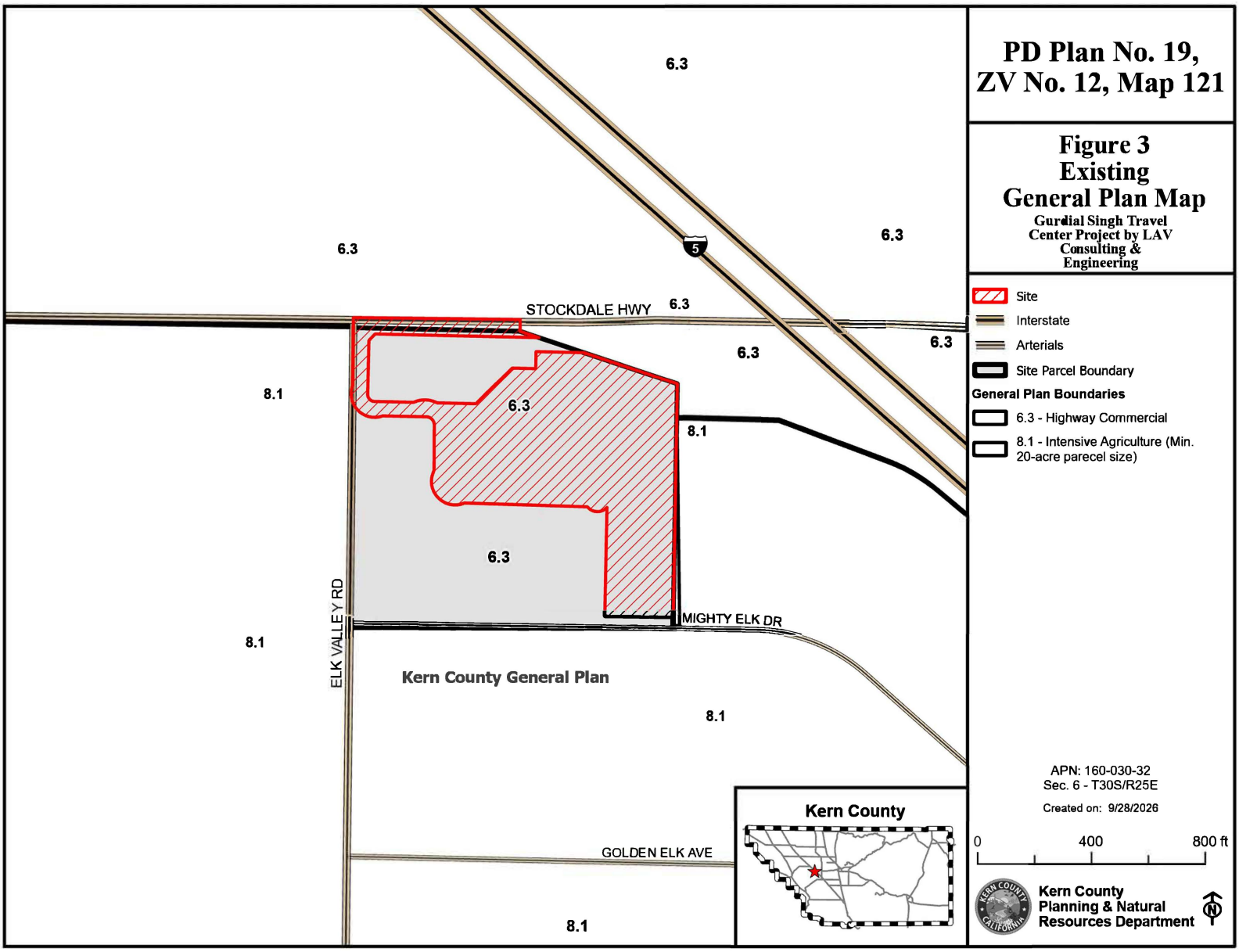
Kern County Planning & Natural Resources Department



PD Plan No. 19, ZV No. 12, Map 121

Figure 3 Existing General Plan Map

Gurdial Singh Travel Center Project by LAV Consulting & Engineering

Site
Interstate
Arterials
Site Parcel Boundary

General Plan Boundaries

6.3 - Highway Commercial
8.1 - Intensive Agriculture (Min. 20-acre parecel size)

APN: 160-030-32
Sec. 6 - T30S/R25E

Created on: 9/28/2026

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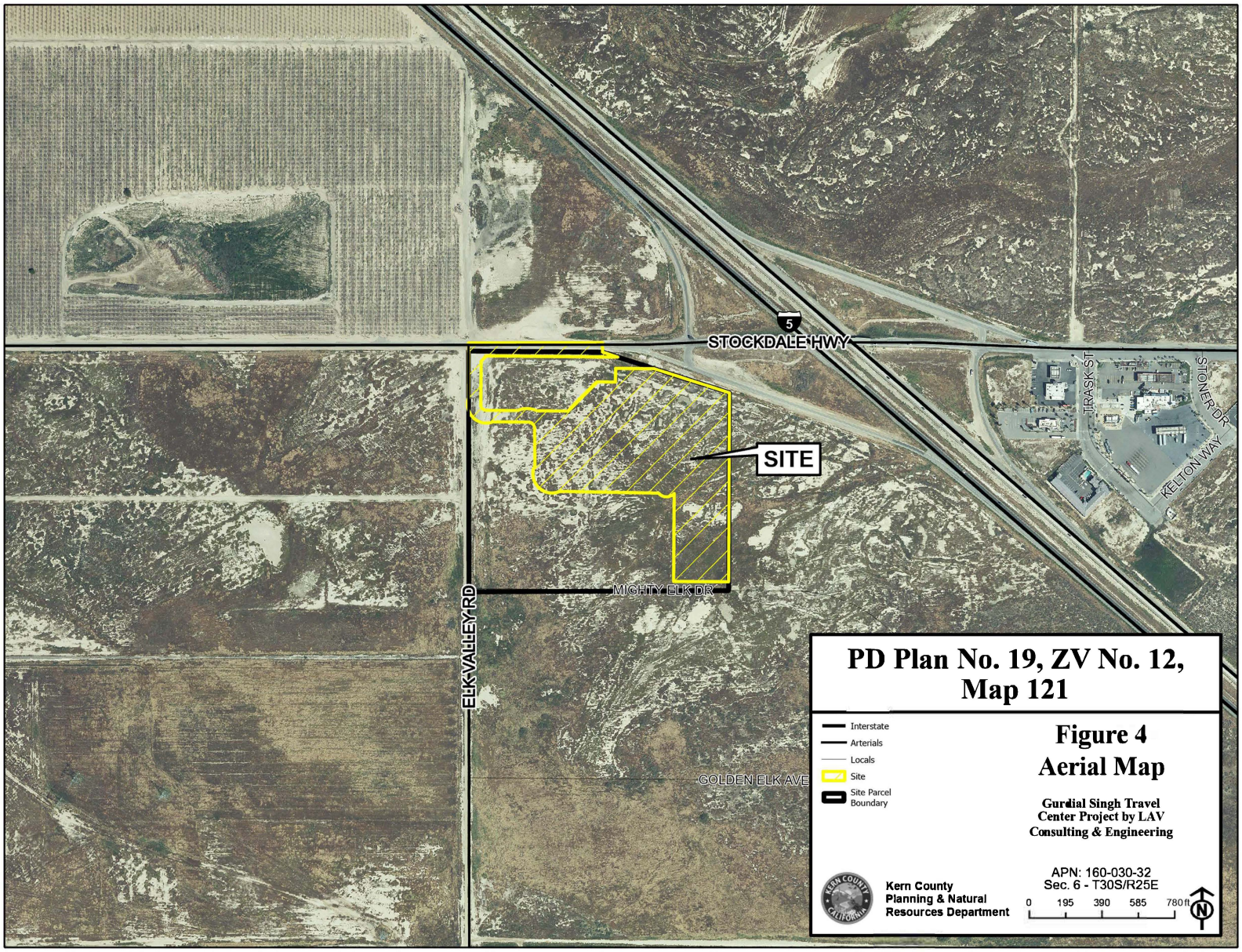
Kern County Planning & Natural Resources Department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SITE
MIGHTY ELK DR
ELK VALLEY RD
GOLDEN ELK AVE
TRASK ST
STONER DR
KELTON WAY
PD Plan No. 19, ZV No. 12, Map 121
Interstate
Arterials
Locals
Site
Site Parcel Boundary
Figure 4
Aerial Map
Gurdial Singh Travel Center Project by LAV Consulting & Engineering
Kern County Planning & Natural Resources Department
APN: 160-030-32
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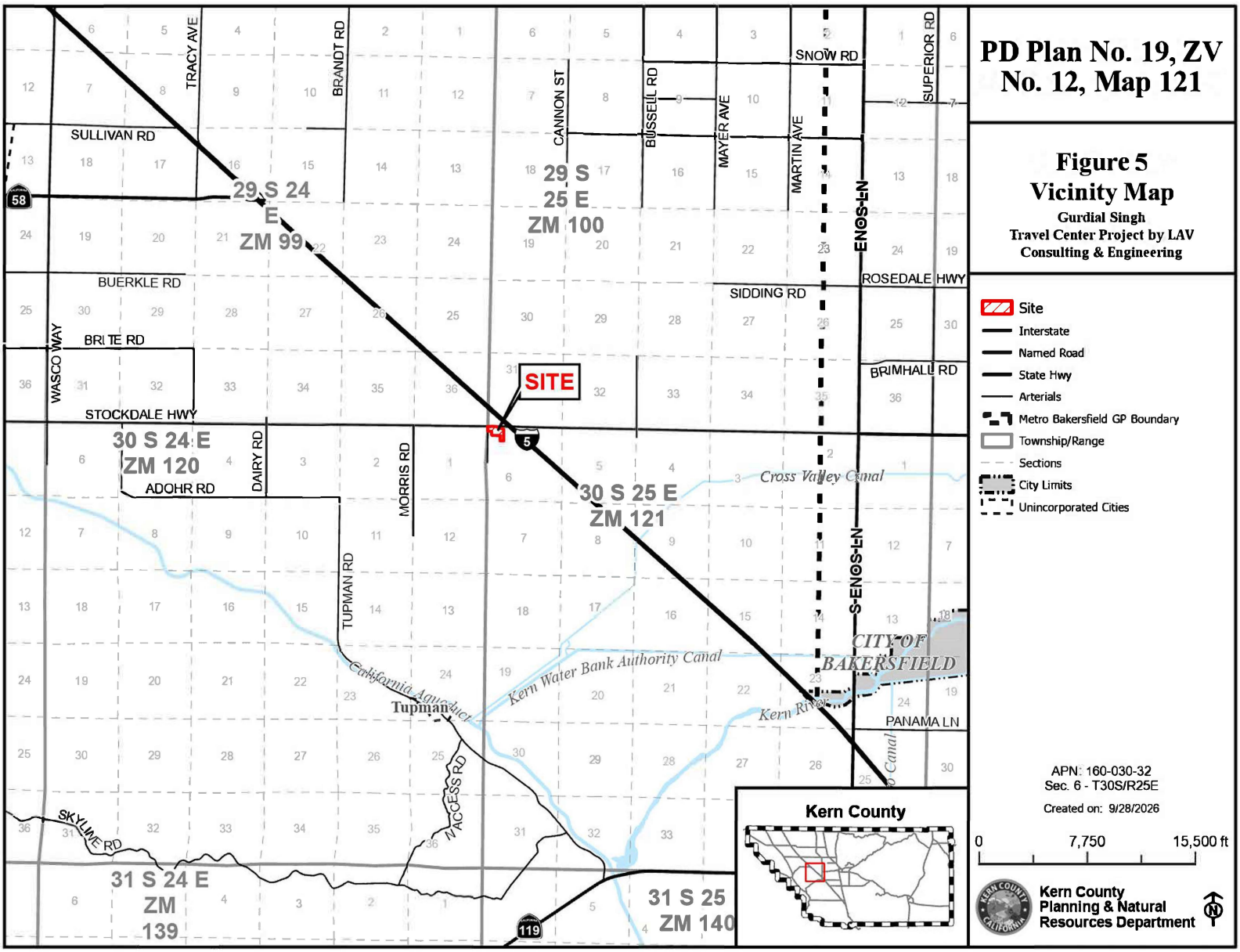
PD Plan No. 19, ZV No. 12, Map 121
Figure 5
Vicinity Map
Gurdial Singh
Travel Center Project by LAV
Consulting & Engineering
SITE
29 S 24 E ZM 99
29 S 25 E ZM 100
30 S 24 E ZM 120
30 S 25 E ZM 121
31 S 24 E ZM 139
31 S 25 ZM 140
SULLIVAN RD
BUERKLE RD
BRITE RD
STOCKDALE HWY
ADOHR RD
SNOW RD
SIDDING RD
ROSEDALE HWY
BRIMHALL RD
PANAMA LN
SKYLINE RD
TRACY AVE
BRANDT RD
CANNON ST
BUSSELL RD
MAYER AVE
MARTIN AVE
SUPERIOR RD
ENOS LN
S ENOS LN
WASCO WAY
DAIRY RD
MORRIS RD
TUPMAN RD
N ACCESS RD
Tupman
Cross Valley Canal
California Aqueduct
Kern Water Bank Authority Canal
Kern River
CITY OF BAKERSFIELD
Site
Interstate
Named Road
State Hwy
Arterials
Metro Bakersfield GP Boundary
Township/Range
Sections
City Limits
Unincorporated Cities
Kern County
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Kern County
Planning & Natural
Resources Department
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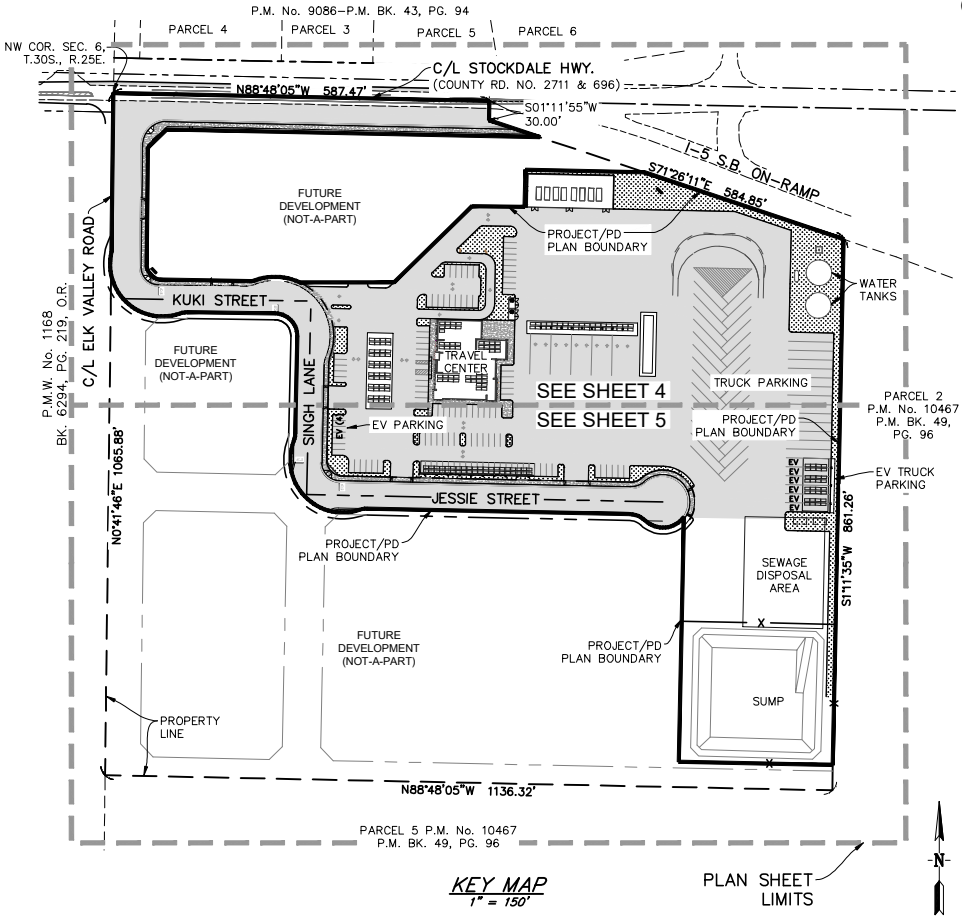
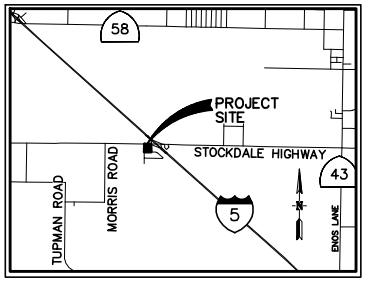
PRECISE DEVELOPMENT PLAN
COMMERCIAL SITE STOCKDALE HWY. & I-5
SEC. 6, T.30S., R.25E., COUNTY OF KERN





VICINITY MAP
NO SCALE

LEGAL DESCRIPTION:

PARCEL 1 OF PARCEL MAP No. 10467 RECORDED FEBRUARY 13, 1998, IN PARCEL MAP BOOK 49, AT PAGE 96 IN THE OFFICE OF THE KERN COUNTY RECORDER. ALSO LYING IN THE NORTHWEST QUARTER OF SECTION 6, TOWNSHIP 30 SOUTH, RANGE 25 EAST, MOUNT DIABLO MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA.

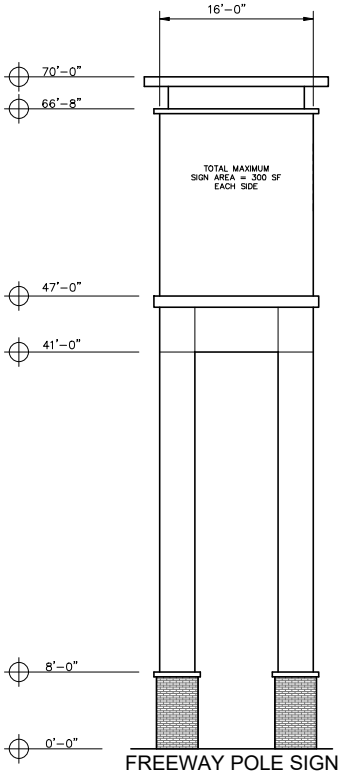
STATISTICAL INFORMATION

ASSESSOR'S NO:	160–030–32
EXISTING ZONING:	CH PD (COMMERCIAL HIGHWAY – PRECISE DEVELOPMENT)
EXISTING USE:	OPEN FIELD (FALLOW)
PROPOSED USE:	(1) TRAVEL CENTER/GAS STATION WITH DRIVE–THRU
TOTAL PROPERTY AREA:	26.41 ACRES
DEVELOPED AREAS:	
TRAVEL CENTER:	8.48 ACRES
SUMP & SEWAGE DISPOSAL:	2.12 ACRES
OFF–SITE STREETS:	1.98 ACRES
TOTAL BUILDING AREA:	12,303 SF
BUILDING HEIGHTS:	SINGLE STORY
BUILDING COVERAGE:	3.18%
LANDSCAPING:	11.61 AC X 5% = 25,286 SF REQUIRED 42,374 SF PROVIDED
SEWAGE DISPOSAL:	PRIVATE SEPTIC SYSTEMS
WATER:	ON–SITE PRIVATE WATER WELL
FIRE:	ON–SITE PRIVATE TANK
SITE DRAINAGE:	ON–SITE PRIVATE SUMP

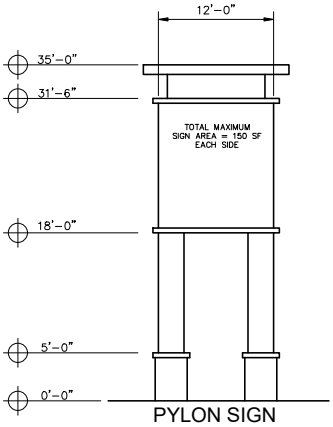
DATE: 09/01/2026

LAV// PINNACLE
Consulting & Engineering Services
Planning • Engineering • Surveying • Project Management
12418 Rosedale Hwy., Suite B, Bakersfield, CA 93312
Phone: (661) 869-0184 // LAV@lavpinnacle.com

PRECISE DEVELOPMENT PLAN
COMMERCIAL SITE STOCKDALE HWY. & I-5
SEC. 6, T.30S., R.25E., COUNTY OF KERN



FREEWAY POLE SIGN



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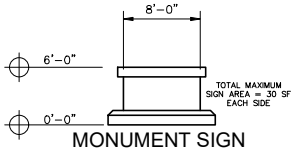

MONUMENT SIGN

NOTE:

19.84.020 – DESIGN AND DEVELOPMENT STANDARDS – MONUMENT SIGNS

A. NO MONUMENT SIGN SHALL BE LOCATED WITHIN ANY EXISTING OR FUTURE RIGHT–OF–WAY LINE.

B. THE MAXIMUM HEIGHT OF THE MONUMENT SHALL BE EIGHT (8) FEET AS MEASURED FROM GRADE LEVEL.

C. MONUMENT SIGNS SHALL BE A MINIMUM OF TWENTY (20) FEET APART, INCLUDING FROM EXISTING MONUMENT SIGNS ON ADJACENT LOTS.

D. LIGHTING OF MONUMENT SIGNS SHALL BE ARRANGED SO AS NOT TO PRODUCE GLARE ON OTHER PROPERTIES IN THE VICINITY

19.84.030 – DESIGN AND DEVELOPMENT STANDARDS – POLE SIGNS

A. THE MAXIMUM AREA OF A POLE SIGN NOT EXCEED TWO HUNDRED (200) SQUARE FEET PER SIDE, EXCEPT AS OTHERWISE SPECIFIED IN THE APPLICABLE BASE DISTRICT.

B. POLE SIGNS SHALL BE LOCATED SO THAT NO PART OF THE SIGN EXTENDS INTO ANY EXISTING OR PROPOSED STREET RIGHT–OF–WAY LINE.

C. THE MAXIMUM HEIGHT OF A POLE SIGN BE TWENTY–FOUR (24) FEET, EXCEPT OTHERWISE SPECIFIED IN THE APPLICABLE BASE DISTRICT

D. POLE SIGNS SHALL BE A MINIMUM OF TWENTY (20) FEET APART, INCLUDING FROM EXISTING POLE SIGNS ON ADJACENT LOTS.

E. LIGHTING OF POLE SIGNS SHALL BE ARRANGED SO AS NOT TO PRODUCE A GLARE ON OTHER PROPERTIES IN THE VICINITY.

DATE: 09/01/2026

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Consulting & Engineering Services
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Phone: (661) 869-0184 // LAV@lavpinnacle.com

PRECISE DEVELOPMENT PLAN
COMMERCIAL SITE STOCKDALE HWY. & I-5
SEC. 6, T.30S., R.25E., COUNTY OF KERN

PARKING REQUIRED

BUILDING USE & SIZE	PARKING REQUIREMENTS	TOTAL REQUIRED SPACES
CONVENIENCE STORE w/FAST FOOD DRIVE THRU 12,303 SF	1 SPACE PER 150 SF OF GROSS AREA	83
	TOTAL SPACES REQUIRED	83 SPACES
	FUEL PUMP CREDITS: 17 FUEL ISLANDS	-17 SPACES
	DRIVE THRU CREDITS: 1 DRIVE THRU'S	-2 SPACES
	TOTAL SPACES REQUIRED	64 SPACES

PARKING NOTES:
1. IN CONJUNCTION WITH A DRIVE-THRU FAST FOOD/RESTAURANT, A CREDIT OF TWO (2) PARKING SPACES MAY BE APPLIED TO THE APPLICABLE OFF-STREET PARKING REQUIREMENTS.
2. IN CONJUNCTION WITH A CONVENIENCE STORE MARKET THAT ALSO PROVIDES GASOLINE SERVICE, A CREDIT OF ONE (1) SPACE MAY BE APPLIED TO EACH GASOLINE PUMP.

PARKING PROVIDED

PASSENGER VEHICLES	
TOTAL STANDARD SPACES PROVIDED	105
TOTAL VAN/ACCESSIBLE SPACES PROVIDED	2
TOTAL ELECTRIC VEHICLE SPACES PROVIDED	4
TOTAL SPACES PROVIDED	105

DIESEL TRUCK PARKING	43
EV TRUCK PARKING	6

NOTE:
ELECTRIC VEHICLE CHARGING STATIONS WILL BE OPERATIONAL AT THE COMMENCEMENT OF EACH USE.

EASEMENT NOTES:

(1) A 30' WIDE EASEMENT FOR INGRESS, EGRESS AND ROAD PURPOSES TO THE PUBLIC IN GENERAL PER DOC. NO. 0198018830 O.R.

(2) A 25' WIDE EASEMENT FOR INGRESS, EGRESS AND ROAD PURPOSES TO THE PUBLIC IN GENERAL PER DOC. NO. 0198018830 O.R.

(3) A 30' WIDE EASEMENT FOR PRIVATE ROAD AND PUBLIC UTILITY PURPOSES PER DOC. NO. 0198018831 O.R.

(4) RELINQUISHMENT OF ACCESS RIGHTS PER BK. 4037, PG. 193, O.R.

(5) FUTURE 60' WIDE IRREVOCABLE OFFER OF DEDICATION TO THE COUNTY OF KERN FOR PUBLIC ACCESS.

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C1	8.69'	25.00'	19°55'11"
C2	70.70'	92.00'	44°01'49"
C3	55.28'	35.01'	90°27'45"
C4	27.26'	37.71'	41°24'58"
C5	68.59'	40.00'	98°15'06"
C6	39.27'	25.00'	90°00'00"
C7	175.46'	82.00'	122°36'00"
C8	12.17'	35.00'	19°55'11"
C9	12.17'	35.00'	19°55'11"
C10	185.82'	82.00'	129°50'22"
C11	12.17'	35.00'	19°55'11"

LEGEND

- PROPERTY/PD BOUNDARY
- STREET CENTERLINE/PROPERTY LINE
- RIGHT OF WAY
- RELINQUISHED ACCESS RIGHTS FOR EASEMENT 4
- PROPOSED LANDSCAPE AREA
- MIN. 2" AC OVER 4" CL II AB COMPACTED TO 95% MAX DENSITY
- PORTLAND CEMENT CONCRETE FLATWORK/SIDEWALK
- EXISTING AC PAVEMENT
- PROPOSED TREE
- (10) NUMBER OF STANDARD PARKING SPACES (9'x20' TYP.)
- [10] NUMBER OF DIESEL TRUCK PARKING SPACES
- (1) EASEMENT NOTE - SEE THIS SHEET
- HANDICAPPED PARKING
- PROPOSED AREA/PARKING LIGHT 25 FT MAX HEIGHT
- PROPOSED TRAFFIC CIRCULATION
- CHARGING STATION
- TE 17'x11' TRASH ENCLOSURE w/ RECYCLING
- OH EXISTING OVERHEAD UTILITY LINE
- EXISTING UTILITY POLE

ESMT.	EASEMENT
EX.	EXISTING
EV	ELECTRIC VEHICLE
R/W	RIGHT-OF-WAY
TYP.	TYPICAL

DATE: 09/01/2026

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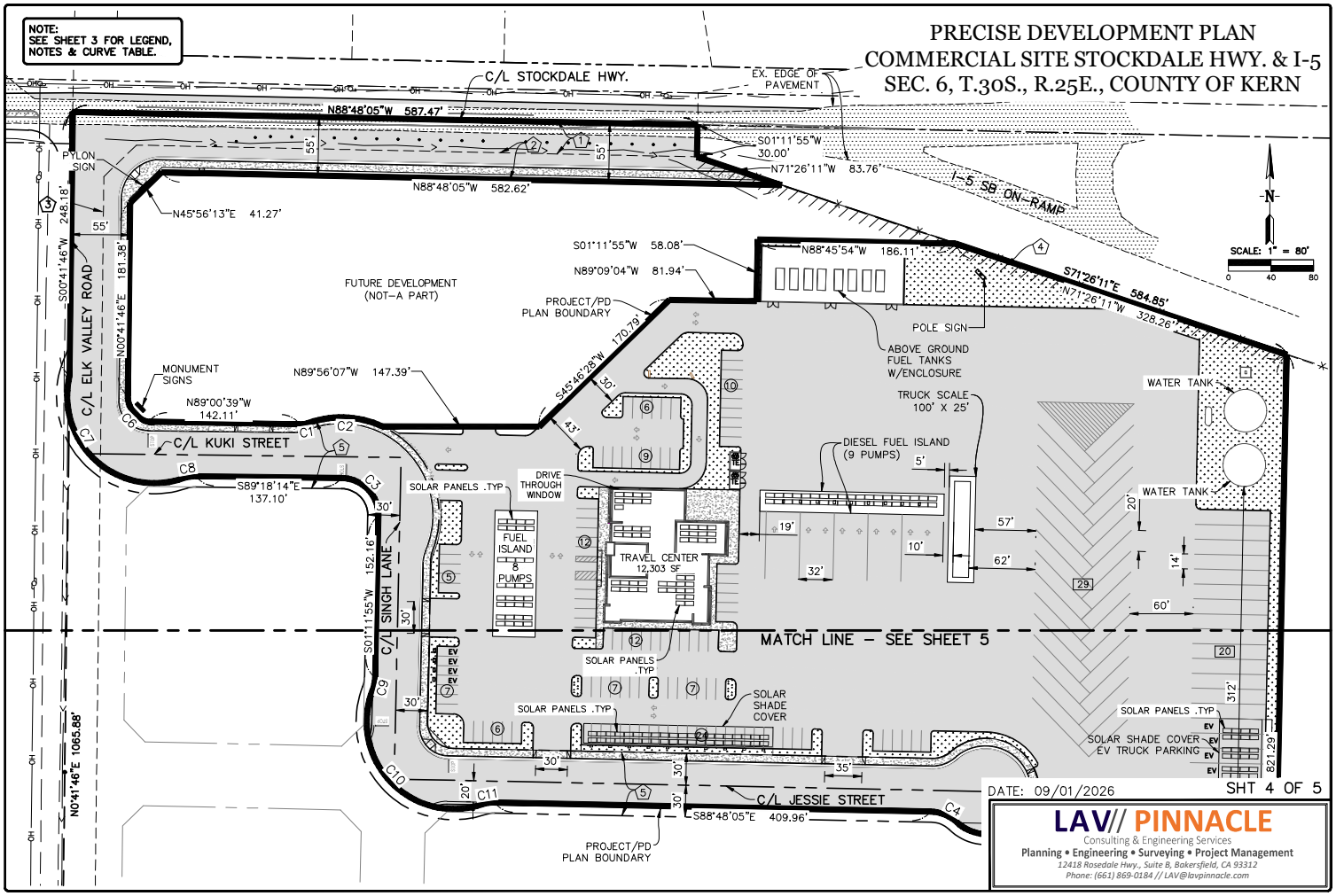
NOTE:
SEE SHEET 3 FOR LEGEND,
NOTES & CURVE TABLE.
PRECISE DEVELOPMENT PLAN
COMMERCIAL SITE STOCKDALE HWY. & I-5
SEC. 6, T.30S., R.25E., COUNTY OF KERN
C/L STOCKDALE HWY.
EX. EDGE OF PAVEMENT
N88°48'05"W 587.47'
S01°11'55"W 30.00'
N71°26'11"W 83.76'
I-5 SB ON-RAMP
N88°48'05"W 582.62'
PYLON SIGN
N45°56'13"E 41.27'
S00°41'46"W 248.18'
N00°41'46"E 181.38'
C/L ELK VALLEY ROAD
SCALE: 1" = 80'
0 40 80
N
S01°11'55"W 58.08'
N89°09'04"W 81.94'
N88°45'54"W 186.11'
S71°26'11"E 584.85'
N71°26'11"W 328.26'
FUTURE DEVELOPMENT
(NOT-A PART)
PROJECT/PD
PLAN BOUNDARY
170.79'
S45°46'28"W
POLE SIGN
ABOVE GROUND
FUEL TANKS
W/ENCLOSURE
MONUMENT
SIGNS
N89°56'07"W 147.39'
N89°00'39"W
142.11'
C/L KUKI STREET
TRUCK SCALE
100' X 25'
WATER TANK
DIESEL FUEL ISLAND
(9 PUMPS)
S89°18'14"E
137.10'
SOLAR PANELS .TYP
DRIVE
THROUGH
WINDOW
FUEL
ISLAND
8
PUMPS
TRAVEL CENTER
12,303 SF
C/L SINGH LANE
S01°11'55"W 152.16'
MATCH LINE - SEE SHEET 5
SOLAR PANELS
.TYP
SOLAR
SHADE
COVER
SOLAR SHADE COVER
EV TRUCK PARKING
N0°41'46"E 1065.88'
C/L JESSIE STREET
S88°48'05"E 409.96'
PROJECT/PD
PLAN BOUNDARY
DATE: 09/01/2026
SHT 4 OF 5
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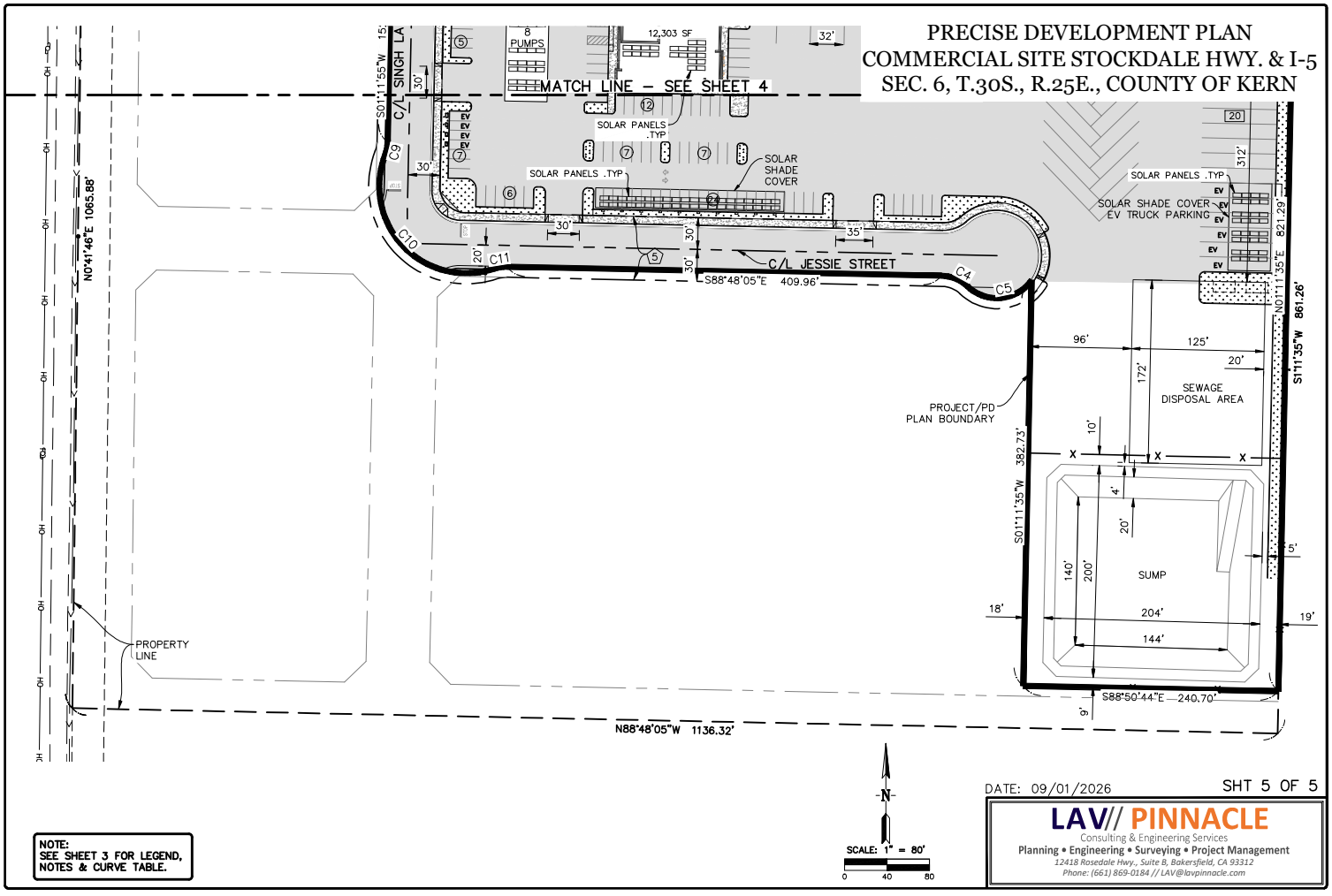
PRECISE DEVELOPMENT PLAN
COMMERCIAL SITE STOCKDALE HWY. & I-5
SEC. 6, T.30S., R.25E., COUNTY OF KERN



NOTE:
SEE SHEET 3 FOR LEGEND, NOTES & CURVE TABLE.

DATE: 09/01/2026

SHT 5 OF 5

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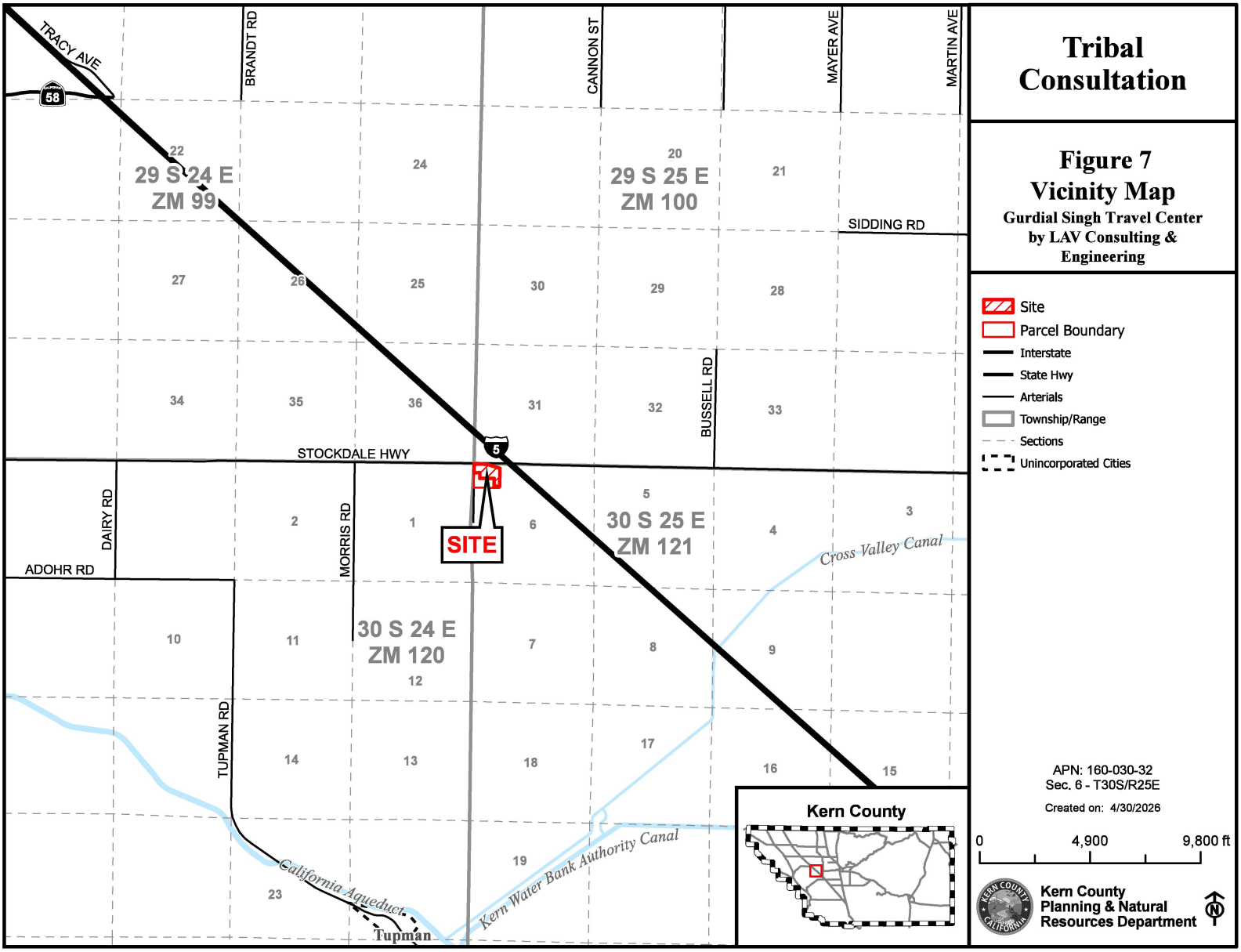
TRACY AVE
68
BRANDT RD
CANNON ST
MAYER AVE
MARTIN AVE
22
29 S 24 E
ZM 99
24
20
29 S 25 E
ZM 100
21
SIDDING RD
27
26
25
30
29
28
34
35
36
31
32
BUSSELL RD
33
STOCKDALE HWY
5
DAIRY RD
2
MORRIS RD
1
SITE
6
5
30 S 25 E
ZM 121
4
3
Cross Valley Canal
ADOHR RD
10
11
30 S 24 E
ZM 120
12
7
8
9
TUPMAN RD
14
13
18
17
16
15
19
California Aqueduct
Kern Water Bank Authority Canal
23
Tupman
Kern County
Tribal Consultation
Figure 7
Vicinity Map
Gurdial Singh Travel Center
by LAV Consulting &
Engineering
Site
Parcel Boundary
Interstate
State Hwy
Arterials
Township/Range
Sections
Unincorporated Cities
APN: 160-030-32
Sec. 6 - T30S/R25E
Created on: 4/30/2026
0
4,900
9,800 ft
Kern County
Planning & Natural
Resources Department
N

Mitigated Negative Declaration

Appendix A
Biological Resource Evaluation

GURDIAL SINGH TRAVEL CENTER
by LAV Consulting and Engineering
(PP26128)

PD No. 19, Map 121
ZV No. 12, Map 121

Kern County
Planning and Natural Resources Department
Bakersfield, CA

September 2026

BIOLOGICAL RESOURCE EVALUATION

Assessor's Parcel Map Number
16-003-032
County of Kern
Bakersfield, California

Prepared for:

LAV//Pinnacle
12418 Rosedale Hwy. #B
Bakersfield, California 93312

Prepared by:

Pruett Biological Resource Consulting
8819 Latera Court
Bakersfield, California 93314
661.421.0006

August 2026

EXECUTIVE SUMMARY

Pruett Biological Resource Consulting, Inc. (PruettBio) has prepared this biological resource evaluation within Vesting Tentative Parcel Map Number 12558, Assessor's Parcel Number (APN) 16-003-032**.** The project consists of 26.01 gross acres (10.52 hectares) (project) of Section 6, Township 30 South, Range 25 East, Mount Diablo Base and Meridian. The project is located at southwest corner of Stockdale Highway and I-5, County of Kern, California.

The project is located within the geographic range of several federal-, and state-listed, threatened and/or endangered plant and animal taxa. Several non-listed, special-status species also have the potential to occur in the vicinity of the project.

The purpose of this report is to document biological resources identified during a reconnaissance-level field study of the project site and include potential biological resources identified during a literature review of the site and vicinity, identify potential impacts to biological resources resulting from the project. Evaluation of potential impacts to plant and animal species are required under federal and state regulation during a General Plan Amendment. California Environmental Quality Act (CEQA) Appendix G thresholds have been used to evaluate potential impacts to biological resources from the proposed project development. Avoidance and minimization measures for implementation prior to and during project activities are recommended as appropriate.

The California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife Service (USFWS) have not been contacted regarding the preparation of this report. Appendix B, Special-Status Plant and Animal Evaluations, satisfy the requirements for an initial determination of potential impacts under the CEQA Appendix G thresholds. If CEQA threshold determinations warrant, further consultation may be required with CDFW and USFWS. If additional consultation with the agencies results in the need for Application for a California Incidental Take Permit, Cal. Code Regs., tit. 14, § 783.2 outlines requirements for detailed species-specific take analysis, proposed measures to minimize and fully mitigate impacts, compliance monitoring, and funding. A detailed description satisfying Cal. Code Regs., tit. 14, § 783.2 is not required to meet the CEQA Appendix G thresholds.

A literature review was conducted of the site and vicinity, prior to the field study, of the biological resources known to occur based on recorded, direct observation, or potentially occurring in the project impact area based on current or historical habitat conditions. During the field study, existing habitat conditions, direct observations and/or species sign were recorded to assess the potential for occurrence of special-status species. This report includes an evaluation of the potential for those special-status biological resources not observed during the field study, with the potential to occur on the property based on the habitat conditions observed.

The project is approximately 9 miles west of Bakersfield in a mostly undisturbed area that was historically used for grazing. The project area is primarily made up of recovering valley saltbush scrub and non-native grassland. The project is bordered on all sides by comparable habitat with a pistachio orchard to the northwest.

The federal and state database queries yielded 17 special-status plant species and 31 special-status animal species as potentially occurring within the vicinity of the project site. Of these, 3 plant species, and 16 animal species have federal-, and/or state-listing and are afforded protection under federal or state law.

A query of the California Native Plant Society (CNPS) database was made for the quadrangle in which the project exists and the eight-quadrangles surrounding the project. The CNPS tracks plant species that do not meet the CEQA Section 15380 criteria for listing as threatened or endangered and are afforded no protection under federal or state law. A United States Geologic Service (USGS) nine-quadrangle query

additionally includes a search area beyond a standard 10-mile radius. Plant species meeting the criteria for Special Status Plants as defined in *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018) and evaluated under CEQA Section 15380 have been included in this report.

Some California Rare Plant Rank (CRPR) 4 taxa may meet the Section 15380 definition of an endangered, rare, or threatened species, and in the definition of CRPR 4, CNPS and CDFW suggest additional reasons for including CRPR 4 taxa in a CEQA analysis. These reasons include Regionally Rare Taxa. Considered locally significant plants, that is, plants that are not rare from a statewide perspective but are rare or uncommon in a local context such as within a county or region (CEQA Guidelines, § 15125, subd. (c)), or as designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). “Locally rare” has not been generally defined, but in counties where a “locally rare” policy exists, it applies to taxa with only five to 10 known occurrences in that county.

The California Natural Diversity Database (CNDDB), Information for Planning and Consultation (IPaC), and CNPS lists were cross-referenced for consistency. A separate CNDDB query for the County of Kern was also generated to evaluate plant species for local significance.

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INTRODUCTION

Pruett Biological Resource Consulting, Inc. (PruettBio) has prepared this biological resource evaluation for the proposed development of APN 16-003-032. The project consists of 26.01 gross acres (10.52 hectares) Section 6, Township 30 South, Range 25 East, Mount Diablo Base and Meridian. The project is located at southwest corner of Stockdale Highway and I-5, County of Kern, California. The report documents biological resources identified during fieldwork conducted on the project site and those identified through a literature search as potentially occurring based on known observations or historic habitat conditions. The report uses the information collected during the field study and literature search to evaluate potential impacts to biological resources, resulting from the project. The report is intended to assist in the analysis of the proposed project for a General Plan Amendment.

Listed plant and animal species are protected under the Federal Endangered Species Act (FESA) and the California Endangered Species Act (CESA). Protection of other non-listed, special-status species is afforded under additional regulation including the Migratory Bird Treaty Act (MBTA). Pursuant to the California Environmental Quality Act (CEQA) impacts to non-listed, special-status species must be evaluated. Where necessary, the report recommends avoidance and minimization measures for implementation prior to and during project activities. The report is intended to provide technical information in support of a CEQA preliminary review. For the purposes of this report, potential impacts to the biological resources of the proposed project were evaluated in accordance with Appendix G of the *CEQA Guidelines* (2025).

PROJECT LEGAL DESCRIPTION

The project proposes development on 26.01 gross acres (10.52 hectares) of APN 16-003-032 in Section 6, Township 30 South, Range 25 East, Mount Diablo Base and Meridian. The project is located at southwest corner of Stockdale Highway and I-5, County of Kern, California.

PROJECT SETTING AND PHYSICAL DESCRIPTION

The project site is in the southern San Joaquin Valley; a broad, treeless plain in the rain shadow of the Inner Coast Ranges. The region's climate can be characterized as Mediterranean; with hot, dry summers and cool, moist winters. Summer high temperatures typically exceed 100 °Fahrenheit (°F); with an average of 110 days per year over 90 °F. Winter temperatures in the San Joaquin Valley are mild, with an average of only 16 days per year with frost (Twisselmann 1967).

Rainfall varies, increasing from west to east, with the west side of the valley receiving an average of around 4 inches (10 centimeters) per year and the east side averaging about 6 inches (15 centimeters) per year. Winter fog, called Tule fog, sometimes forms during the months of November, December, and January, supplementing the annual precipitation. Approximately 90% of the rainfall in the region occurs between November 1 and April 1. Drought cycles occur periodically, becoming severe enough that plant and animal populations can experience large fluctuations. The vegetation communities in the San Joaquin Valley are distinguishable from the Mojave Desert to the east due to Tule fog, higher humidity, and isolation from continental climatic influences by mountain ranges (Twisselmann 1967).

The general topography of the area is generally flat at about 300 feet (182 meters) above mean sea level. The project is approximately 9 miles west of Bakersfield in a mostly undisturbed area that was historically used for grazing. The project area is primarily made up of recovering valley saltbush scrub and non-native grassland. The project is bordered on all sides by comparable habitat with a pistachio orchard to the northwest.

METHODS

LITERATURE REVIEW

PruettBio conducted a literature review to identify known observations and potential for listed, or otherwise special-status, species to occur in the vicinity of the project site. A standard, 10-mile (16-kilometer) radius query was performed. Database records reviewed included:

- **United States Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC):** The IPaC report generates a list of federal-listed species and other resources under the jurisdiction of the USFWS, including designated critical habitat for listed species, National Wildlife Refuge lands, and Wetlands in the National Wetlands Inventory. The list includes resources that are outside of the project site, but that have the potential to be impacted by project activities.

- **USFWS National Wetlands Inventory:** The Wetlands Mapper is an online inventory integrating digital map data and other resources to provide current information regarding the status of national wetlands, riparian, and deepwater habitats.

- **United States Department of Agriculture (USDA) WebSoil Survey:** The report is an online database providing soil data produced by the National Cooperative Soil Survey, a joint effort of the USDA and other federal, state, and local agencies. The information drawn for the Soil Survey of Kern County, California, Northwestern Part was originally drawn from fieldwork completed in 1981 with soil names and descriptions approved in 1982.

- **California Natural Diversity Database (CNDDB-RareFind 5):** The CNDDB is a database of listed, or otherwise special-status, plant and animal species and sensitive communities maintained by the California Department of Fish and Wildlife (CDFW). The information queried for this report included a standard 10-mile radius of the project site.

- **California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants:** CNPS is a private, professional organization that maintains a database evaluating the current conservation status of California's rare, threatened, and endangered plant species. The information queried for this report included a standard 10-mile radius of the project site. The list includes resources that are outside of the project site, but that have the potential to be impacted by project activities based on known historic or current habitat features. The data base was compared to the CNDDB and IPaC queries for consistency.

FIELD STUDY

A reconnaissance-level, biological field study was conducted by Jared Pratt and Miguel Estenssoro on August 3, 2026. The project was surveyed by walking transects spaced approximately 100 feet apart to obtain maximum visual coverage of the site. Field notes included observations of all plant and wildlife species observed. Direct observations and/or species sign was recorded to assess the potential for occurrence. Land cover types and general habitat conditions were recorded and photographed. Special-status species and habitat features, such as vegetation communities or ephemeral channels, were also recorded and photographed if observed.

Coordinates for important biological resource elements and direct observations of special-status species were recorded using a handheld geographic positioning system unit. If observed, San Joaquin kit fox (SJKF) dens were classified as defined by the *USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (2011). All plant taxa encountered were identified to the extent possible given the diagnostic features present. Identifications were made using keys contained in *The Jepson Manual: Vascular Plants of California* and online updates containing revisions to taxonomic treatments (Baldwin et al. 2012; Jepson Flora Project 2015).

RESULTS

This section summarizes the results of the field study conducted on the project site and evaluates those results for the known or potential for occurrence of special-status species based on the literature review and database queries and pursuant to statutory regulation. Discussions are provided describing the existing habitat conditions including vegetation communities, land cover and current use; soils; special-status biological resources potentially occurring in the vicinity of the project site; the potential for jurisdictional resources including designated critical habitat and riparian/wetland/water resource features; the potential for wildlife migration corridors and nursery sites; and regional and local policy.

VEGETATION COMMUNITIES AND LAND COVER

The project site is located west of the urban development of Metropolitan Bakersfield. The primary vegetive communities of the project site were Non-native Grassland (Holland 42200) and Valley Saltbush Scrub (Holland 36220). The majority of the site is comprised of native, or recovering habitat and is bordered to the north, east and west by similar vegetative communities.

SOILS

Map Unit Symbol	Map Unit Name	Description
156	Garces silt loam	This component is on valley non-buried fan remnants formed from consisting of alluvium derived from granitoid

Source: NRCS 2026

BIOLOGICAL RESOURCES

The literature review and database queries yielded 17 special-status plant species as potentially occurring within the vicinity of the project site. Thirty-one animal species were identified as potentially occurring in the region of the project site. No evidence of any locally rare plant or animal species was observed. No evidence of special-status plant or animal species was observed during the field study.

No focused, protocol-level surveys were conducted for the preparation of this report. The field study was conducted outside of the blooming period for many of the special-status plant species potentially occurring in the vicinity of the project. The evaluation of special-status species that were found during the literature review with a potential to occur in the region are included in Appendix B.

Special-Status Plant Species

The federal and state database queries yielded 17 special-status plant species as potentially occurring within the vicinity of the project site. A query of the California Native Plant Society (CNPS) database was made for the nine-quadrangles surrounding the project. A USGS nine-quadrangle query additionally includes a search area beyond a standard 10-mile radius. Plant species meeting the criteria for Special Status Plants as defined in *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018) were evaluated under CEQA Section 15380.

Special-status plant species considered in this evaluation include all plant species that meet one or more of the following criteria:

- Listed or proposed for listing as threatened or endangered under ESA or candidates for possible future listing as threatened or endangered under the ESA (50 CFR §17.12).

- Listed or candidates for listing by the State of California as threatened or endangered under CESA (Fish and Game Code §2050 et seq.). A species, subspecies, or variety of plant is endangered when the prospects of its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease, or other factors (Fish and Game Code §2062). A plant is threatened when it is likely to become endangered in the foreseeable future in the absence of special protection and management measures (Fish and Game Code §2067).

- Listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 et seq.). A plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901).

- Meet the definition of rare or endangered under CEQA §15380(b) and (d). Species that may meet the definition of rare or endangered include the following:
    - Species considered by the California Native Plant Society (CNPS) to be “rare, threatened or endangered in California” (Lists 1A, 1B and 2);
    - Species that may warrant consideration on the basis of local significance or recent biological information.
    - Some species included on the California Natural Diversity Database’s (CNDDB) Special Plants, Bryophytes, and Lichens List (California Department of Fish and Game 2008).

- Considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type.

Some CRPR 4 taxa may meet the Section 15380 definition of an endangered, rare, or threatened species, and in the definition of CRPR 4, CNPS and CDFW suggest additional reasons for including CRPR 4 taxa in a CEQA analysis. These reasons include Regionally Rare Taxa. Considered locally significant plants, that is, plants that are not rare from a statewide perspective but are rare or uncommon in a local context such as within a county or region (CEQA Guidelines, § 15125, subd. (c)), or as designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). “Locally rare” has not been generally defined, but in counties where a “locally rare” policy exists, it applies to taxa with only five to 10 known occurrences in that county. The CNDDB, IPaC, and CNPS lists were cross-referenced for consistency.

Of the 17 special-status plant species returned during database queries for the project vicinity, 3 species are either federally- or state-listed as threatened or endangered. Although CEQA requires consideration for impacts to locally significant plant species, no mitigation is legally required to compensate for impacts to non-listed plant species. No listed, or otherwise special-status plant species was observed during the fieldwork conducted for the preparation of this report. No listed, or otherwise special-status plant species, has been recorded as occurring within the project site.

Special-Status Animal Species

The federal and state database queries yielded 31 special-status animal species as potentially occurring within the vicinity of the project site. Of these, 16 animal species have federal-, and/or state-listing and are afforded protection under federal or state law. Special-status animal species considered in this evaluation include those that may occur in the project vicinity that have statutory protections. This includes federal- and state-listed (rare, threatened, or endangered; fully protected) species and candidates for listing under the respective endangered species acts. Species that are of special concern to the CDFW or the USFWS are included in this evaluation. Special-status bird species that are afforded

protection under the MBTA which may nest on or within an approximate 10-mile (16-kilometer) radius of the project site are also evaluated.

Designated Critical Habitat

The USFWS IPaC report and USFWS Designated Critical Habitat Mapper lists no Designated Critical Habitat (USFWS 2026). Designated Critical Habitats closest to the project site are Buena Vista Lake shrew (*Sorex ornatus relictus*) approximately 10-miles southwest and California condor (*Gymnogyps californianus*) approximately 23 miles southeast of the project site. No suitable habitat for either species exists on the project site.

Jurisdictional Water Resource Features

Section 404 of the Federal Clean Water Act (CWA) regulates discharge of dredged and fill material into Waters of the United States. Wetlands are included under this jurisdiction. Proposed activities that may result in discharge of material into Waters of the U.S. require a permit review process by the U.S. Army Corps of Engineers as set forth under CWA section 404(b)(1). Fish and Game Code section 1602 requires any person, state or local governmental agency, or public utility to notify CDFW before beginning any activity that will substantially modify a river, stream, or lake.

A search of the USFWS National Wetlands Inventory resulted in no riparian, wetlands, or other jurisdictional water features mapped on the project site (USFWS 2026). These results are consistent with the observed conditions within the survey area.

Special-Status Natural Communities

No special-status vegetation communities on the project site were identified by the USFWS IPaC query, the CNDDB, or the CNPS Inventory (USFWS 2026, CDFW 2026, CNPS 2026). These results are consistent with the observed conditions within the survey area.

Wildlife Migration Corridors and Nursery Sites

Wildlife corridors can be defined as connections between wildlife blocks that meet specific habitat needs for species movement generally during migratory periods but seasonally as well. Wildlife corridors generally contain habitat dissimilar to the surrounding vicinity and include examples such as riparian areas along rivers and streams, washes, canyons, or otherwise undisturbed areas within urbanization. Corridor width requirements can vary based on the needs of the species utilizing them. Development of the project would not impact wildlife migration corridors or nursery sites.

Regional and Local Policies

The proposed, modified project will not conflict with existing or adopted Habitat Conservation Plans, Natural Community Conservation Plans, local or regional conservation plans, or local ordinances protecting biological resources.

IMPACT ANALYSIS AND RECOMMENDED MITIGATION MEASURES

CEQA Appendix G thresholds have been used to evaluate potential impacts to the biological resources from the proposed project. Appendix G provides an analysis of the impacts of the proposed project following the standards of CEQA and provides recommendations that, when implemented, would reduce impacts to less-than-significant levels. It is important to note that potential take of any federal- or state-listed species from project activities would require contacting the appropriate wildlife agency (the USFWS and/or the CDFW).

The California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife Service (USFWS) have not been contacted regarding the preparation of this report. Appendix B, Special-Status Plant and Animal Evaluations, satisfy the requirements for an initial determination of potential impacts under the CEQA Appendix G thresholds. If additional consultation with the agencies results in the need for Application for a California Incidental Take Permit, Cal. Code Regs., tit. 14, § 783.2 outlines requirements for detailed species-specific take analysis, proposed measures to minimize and fully mitigate impacts, compliance monitoring, and funding. A detailed description satisfying Cal. Code Regs., tit. 14, § 783.2 is not required to meet the CEQA Appendix G thresholds.

The project would create a significant impact to biological resources, based on the specifications in Appendix G of the CEQA Guidelines, if the following were to occur:

1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;

2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;

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;

4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;

6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

The following analysis discusses potential impacts associated with the development of the project and provides recommendations where appropriate to further reduce potential impacts.

1. Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, by the CDFW, or the USFWS?

Direct and indirect impacts, in the form of “incidental take” of a threatened, endangered, or otherwise protected species, are not expected to occur as a result of the development of the proposed project. Implementation of standard measures for the protection of biological resources are recommended to avoid and minimize potential impact to general wildlife. These measures include, but may not be limited to:

- A biological resource pre-activity survey conducted by a qualified biologist no more that 30-days before the start of construction activities,
- Biological resource monitoring during each initial phase of ground disturbance,
- Compliance reporting provided to the required oversight agencies for all biological resource field surveys, monitoring, and additional tasks as warranted.

The project is within the historic range of Tipton kangaroo rat. The project was located within the southwest focus area for the species in the previous habitat conservation plan at the northwestern edge. The project is ranked low to medium suitability for kangaroo rat habitat in CDFW’s California Wildlife

Habitat Relationship system habitat suitability modeling (CWHR 2026). Small mammal trapping would confirm small mammal species occupying the project.

2. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the CDFW or the USFWS?

No 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 exists on the project site. No adverse effect will occur as a result of the development of the proposed project and no mitigation measures are recommended.

3. Would the project 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?

No features, identified in wetland categories, appear on the USFWS National Wetlands Inventory mapping (USFWS 2025) on the proposed, modified project site. No federally protected wetlands as defined by Section 404 of the Clean Water Act were identified during the field study conducted for the preparation of this report. No substantial adverse effect will occur as a result of the development of the project. No mitigation measures are recommended.

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

No migratory wildlife corridors were identified during the literature search or field study. The project will not interfere substantially with the movement of any native fish of wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. The following recommendations are provided for the general protection of bird species that may occur on the project site or vicinity in compliance with the MBTA:

If ground-disturbing activities are planned during the nesting season for migratory birds that may nest on or near the site (generally February 1 through August 31), nesting bird surveys are recommended prior to the commencement of ground disturbance for project activities. If nesting birds are present, no new construction or ground disturbance should occur within an appropriate avoidance area for that species until young have fledged, unless otherwise approved and monitored by a qualified onsite biologist. Appropriate avoidance should be determined by a qualified biologist. In general, minimum avoidance zones for active nests should be implemented as follows: 1) ground or low-shrub nesting non-raptors – 300 feet (91 meters); 2) burrowing owl – as appropriate based on nest location, existing surrounding activity, and evaluation of owl behavior. Coordination with CDFW may be warranted. 3) Sensitive raptors (e.g., prairie falcon, golden eagle) – 0.5 miles (0.8 kilometers); 3) other raptors – 500 feet (152 meters).

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

There are no biological resources on the site which are protected by local policies. Impacts from conflicts with local policies will not occur. No additional mitigation measures are recommended.

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.

The project does not conflict with any Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No additional mitigation measures are recommended.

RECOMMENDED MITIGATION MEASURES

The following Avoidance and Minimization Measures (AMM) represent the authors professional opinion regarding reducing the probability of take occurring during project activities. The following AMMs are generally regarded as best management practices during construction activities in the southern San Joaquin valley, however they are not a substitute for procuring the appropriate state and federal permits to allow for take of special-status species during project activities and do not provide coverage should take occur during project activities. Communication with state and federal agencies regarding proposed AMMs is recommended prior to initial ground disturbance to fully comply with FESA, CESA, and CEQA.

These measures include, but may not be limited to:

- A biological resource pre-activity survey conducted by a qualified biologist no more that 30-days before the start of construction activities,
- Biological resource monitoring during each initial phase of ground disturbance,
- Compliance reporting provided to the required oversight agencies for all biological resource field surveys, monitoring, and additional tasks as warranted,
- A Worker Environmental Awareness Program outlining special-status species that may access, use or otherwise transverse the project area will be implemented,
- If known or natal SJKF dens are identified at any time during construction, protocols enumerated in the *USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (2011) should be implemented, and the appropriate agencies contacted for guidance.
- Vertical sided trenching deeper than 2-feet will include escape ramps at no more than a 1:1 ratio every 100 feet,
- Vertical sided holes that are not capable of being ramped should be covered or otherwise secured to the greatest extent practicable
- Pipes, conduit and similar material 3 inches or greater should be capped to prevent wildlife from becoming inadvertently trapped in the piping

The following recommendations are provided for the general protection of bird species that may occur on the project site or vicinity in compliance with the MBTA:

If ground-disturbing activities are planned during the nesting season for migratory birds that may nest on or near the site (generally February 1 through August 31), nesting bird surveys are recommended prior to the commencement of ground disturbance for project activities. If nesting birds are present, no new construction or ground disturbance should occur within an appropriate avoidance area for that species until young have fledged, unless otherwise approved and monitored by a qualified onsite biologist. Appropriate avoidance should be determined by a qualified biologist. In general, minimum avoidance zones for active nests should be implemented as follows:

1) Ground or low-shrub nesting non-raptors – 300 feet (91 meters),
2) Burrowing owl – as appropriate based on nest location, existing surrounding activity, and evaluation of owl behavior. Coordination with CDFW may be warranted,
3) Sensitive raptors (e.g., prairie falcon, golden eagle) – 0.5 miles (0.8 kilometers),
4) Other raptors – 500 feet (152 meters).

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APPENDIX A

PROJECT VICINTY AND SITE

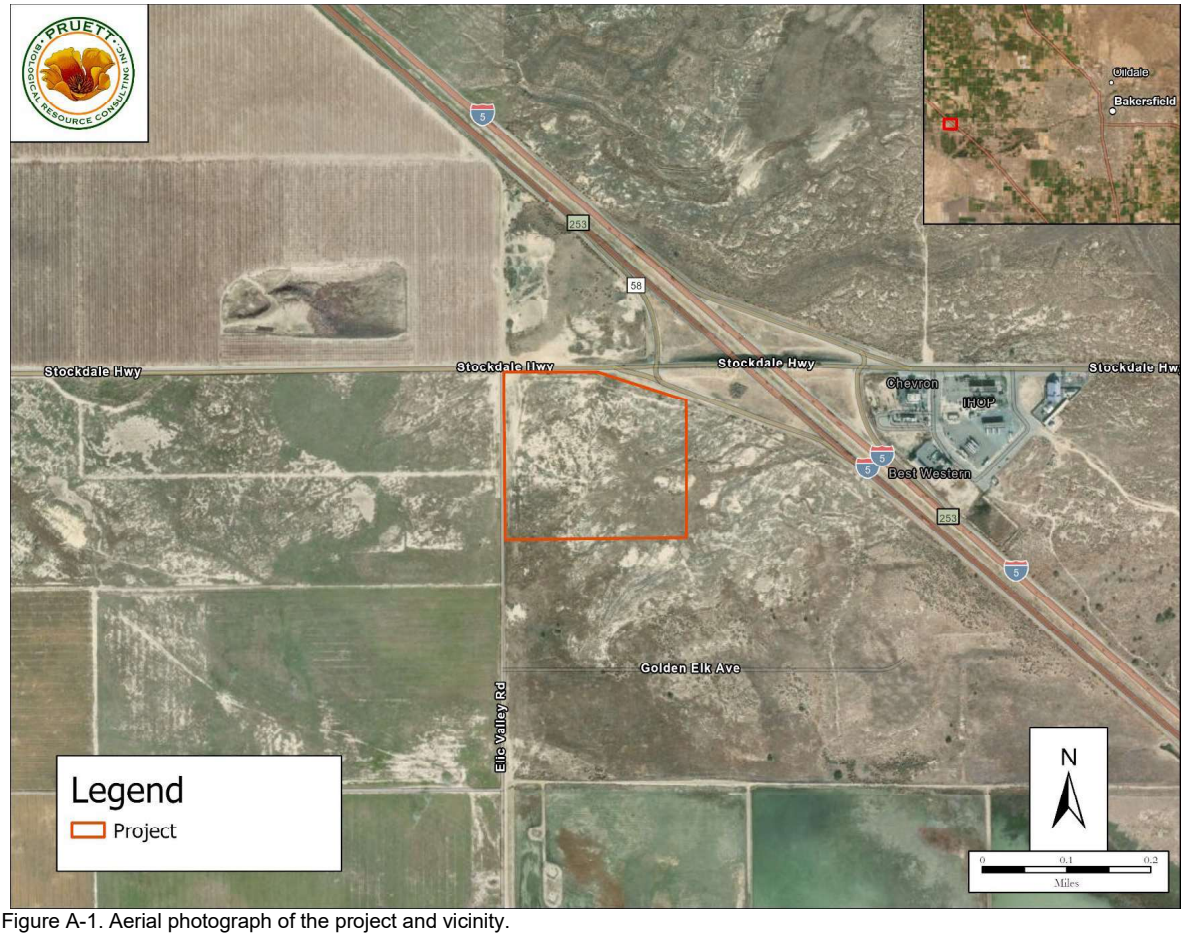

Figure A-1. Aerial photograph of the project and vicinity.

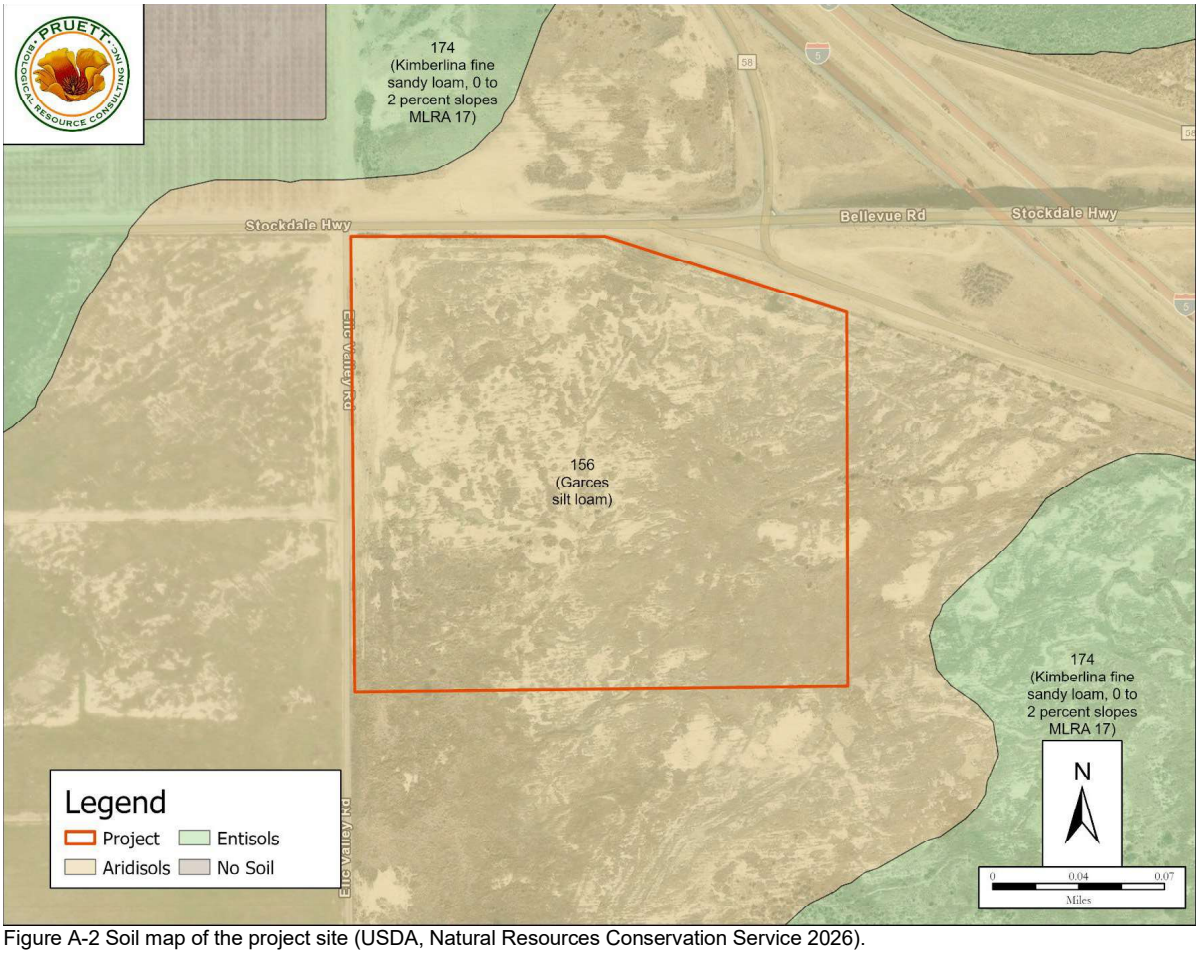

Figure A-2 Soil map of the project site (USDA, Natural Resources Conservation Service 2026).

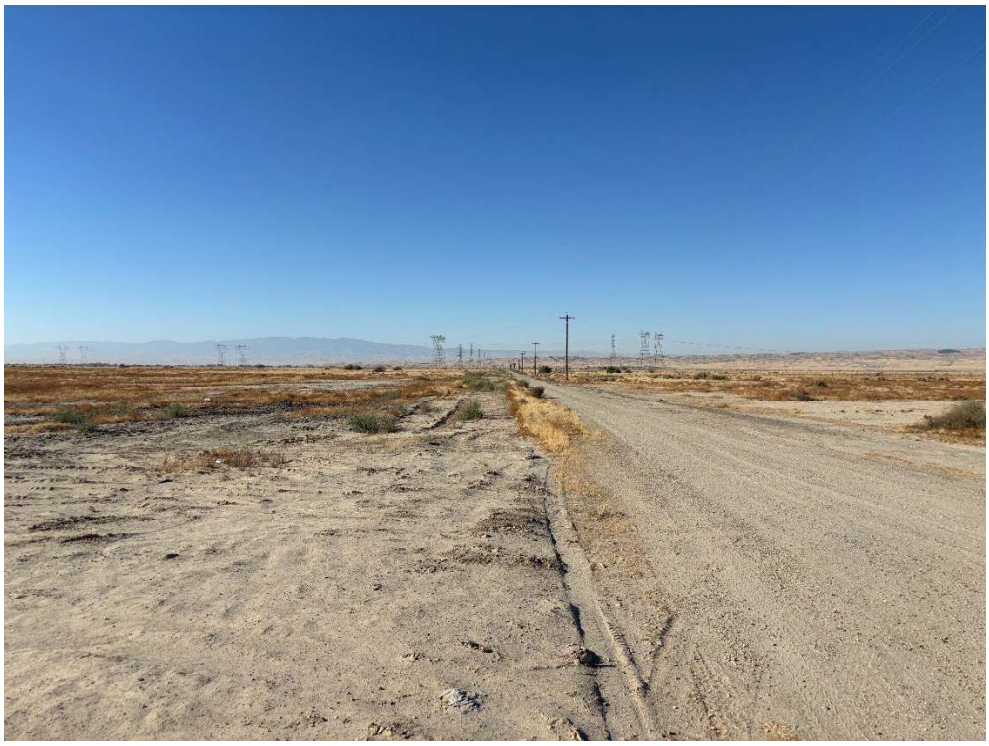

Figure A-3. Photograph of the project site taken from the NW corner facing S.



Figure A-4. Photograph of the project site taken from the NW corner facing E.



Figure A-5. Photograph of the project site taken from near the NE corner facing W.



Figure A-6. Photograph of the project site from near the SE corner facing N.

APPENDIX B

SPECIAL-STATUS PLANT AND ANIMAL EVALUATION

Table B-1: Special-status Plants That May Occur in the Vicinity of the Project.

Scientific Name **Common Name**	**Status Fed/State/CNPS**	**Description**	**Blooming Period**	**Field Study Results/Potential for Occurrence**
Astragalus hornii var. *hornii* Horn's milk vetch	S/-/1B.1	Annual herb in the Fabaceae found in meadows and seeps and on playas and lake margins on alkaline soils between 197 and 2,789 feet (60–850 meters) in elevation. Known from occurrences in the Southern San Joaquin Valley, the Tehachapi Mountains and the Western Transverse Ranges in Kern, Los Angeles, and San Bernardino Counties.	May to October	**Not Observed**. Survey was conducted within the blooming period for this species. The nearest known occurrence found was 5.6 miles away and recorded in 1958.
Atriplex cordulata var. *cordulata* heartscale	S/-/1B.2	Annual herb in the Chenopodiaceae family found in chenopod scrub, meadows and seeps, and valley and foothill grasslands in sandy, saline or alkaline soils below 785 feet (240 meters) in elevation. Known to occur in Alameda, Butte, Colusa, Contra Costa, Fresno, Glenn, Kern, Madera, Merced, Solano, and Tulare Counties. Presumed extirpated from San Joaquin, Stanislaus, and Yolo Counties.	April to October	**Not Observed**. Survey was conducted within the blooming period for this species. The nearest known occurrence found was 6.5 miles away and recorded in 2003.
Atriplex cordulata var. *erecticaulis* Earlimart orache	S/-/1B.2	Annual herb in the Chenopodiaceae found in valley and foothill grasslands between 130 and 330 feet (40-100 meters) in elevation. Known to occur in Fresno, Kern, Kings, and Tulare Counties.	August to September	**Not Observed**. Survey was conducted within the blooming period for this species. No occurrence data available within 10 miles of the project site.
Atriplex coronata var. *vallicola* Lost Hills crownscale	-/-/1B.2	Herbaceous annual in the Chenopodiaceae found in chenopod scrub, valley and foothill grasslands, and vernal pools in alkaline soils between 165 and 2,085 feet (50 – 635 meters) in elevation. Known to occur in Fresno, Kern, Kings, Merced, Monterey, San Benito, San Luis Obispo, and Tulare Counties.	June to August (occasionally October)	**Not Observed**. Survey was conducted within the blooming period for this species. The nearest known occurrence found was 4.7 miles away and recorded in 1999.
Atriplex minuscula Lesser saltscale	S/-/1B.2	Herbaceous annual in the Chenopodiaceae found in chenopod scrub, playas, and valley and foothill grassland in alkaline and sandy soils between 50 and 655 feet (15–200 meters) in elevation. Known to occur in Alameda, Butte, Fresno, Kern, Kings, Madera, Merced, and Tulare Counties. Presumed extirpated from Stanislaus County.	May to October	**Not Observed**. Survey was conducted within the blooming period for this species. No occurrence data available within 10 miles of the project site.

Scientific Name **Common Name**	**Status Fed/State/CNPS**	**Description**	**Blooming Period**	**Field Study Results/Potential for Occurrence**
Atriplex subtilis Subtle orache	S/-/1B.2	Annual herb in the Chenopodiaceae family found in valley and foothill grasslands in alkaline soils between 130 and 330 feet (40 – 100 meters) in elevation. Known to occur in Butte, Fresno, Kern, Kings, Madera, Merced, Stanislaus, and Tulare Counties.	June to September (occasionally October)	**Not Observed**. Survey was conducted within the blooming period for this species. The nearest known occurrence found was 4.1 miles away and recorded in 1999.
Calochortus striatus Alkali mariposa lily	S/-/1B.2	Bulbiferous perennial herb in the Liliaceae found in chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grasslands on sandy often granitic, sometimes serpentine soils, between 230 and 5,235 feet (70–1,595 meters). Known to occur in the Inyo, Kern, Los Angeles, San Bernardino, and Tulare Counties.	April to June	**Not Observed**. Survey was not conducted within the blooming period for this species. The nearest known occurrence found was 9.3 miles away and recorded in 2006.
Caulanthus californicus California jewelflower	E/E/1B.1	Annual herb in the Brassicaceae family found chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland habitats on sandy soils between 200 and 3,280 feet (61–1000) in elevation.	February to May	**Not Observed**. Survey was not conducted within the blooming period for this species. The nearest known occurrence found was 7.7 miles away and recorded in 1986.
Cirsium crassicaule slough thistle	S/-/1B.1	Annual or perennial herb in the Asteraceae family found in chenopod scrub, marshes and swamps (sloughs), and riparian scrub below 330 feet (100 meters). Known to occur in Kern, Kings, and San Joaquin Counties.	May to August	**Not Observed**. Survey was conducted within the blooming period for this species. The nearest known occurrence found was 2.9 miles away and recorded in 2004.
Delphinium recurvatum Recurved larkspur	S/-/1B.2	Perennial herb in the Ranunculaceae family found in chenopod scrub, cismontane woodland, and valley and foothill grassland habitats below 2,590 feet (790 meters) in elevation. Known to occur in Kern and Tulare Counties.	March to June	**Not Observed**. Survey was not conducted within the blooming period for this species. The nearest known occurrence found was immediately north and east of the project and was recorded at in an unknown year in the 1980s.

Scientific Name **Common Name**	**Status Fed/State/CNPS**	**Description**	**Blooming Period**	**Field Study Results/Potential for Occurrence**
Eremalche parryi ssp. *kernensis* Kern mallow	E/-/1B.2	Annual herb in the Malvaceae family found in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland habitats in clay, dry, openings, and sandy soils often at the edge of balds between 230 and 4,230 feet (70 – 1,290 meters) in elevation. Known to occur in Kern, Kings, San Luis Obispo, Santa Barbara, Tulare, and Ventura Counties.	January to May	**Not Observed**. Survey was not conducted within the blooming period for this species. The nearest known occurrence found was 0.5 miles away and recorded in 2013.
Eschscholzia lemmonii ssp. *kernensis* Tejon poppy	S/-/1B.1	Annual herb in the Papaveraceae family found in valley foothill and grasslands and chenopod scrub, generally on loose, calcareous soils between 525 and 3,280 feet (200–1,000 meters) in elevation. Known to occur in Kern and San Luis Obispo Counties.	(February)March to May	**Not Observed**. Survey was conducted within the blooming period for this species. The nearest known occurrence found was 6.1 miles away and recorded in 1998.
Lasthenia chrysantha alkali-sink goldfields	-/-/1B.1	Perennial herb in the Poaceae family found in chaparral, coastal sage scrub, creosote bush scrub and wetland-riparian communities below 3,985 feet (1,215 meters). Known to occur in Butte, Lake, Fresno, Tulare, Inyo, Kern, Santa Barbara, Ventura, San Bernadino, Orange, Riverside, San Diego and Imperial Counties.	September to May	**Not Observed**. Survey was not conducted within the blooming period for this species. The nearest known occurrence found was 1.6 miles away.
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	S/-/1B.1	Annual herb in the Asteraceae family found in coastal salt marshes and swamps, playas, and vernal pools below 4,005 feet (1,220 meters) in elevation. Known to occur in Colusa, Merced, Orange, Riverside, San Diego, San Luis Obispo, Santa Barbara, Solano, Tehama, Tulare, Ventura, and Yolo Counties. Presumed extirpated from Kern, Los Angeles, and San Bernardino Counties.	February to June	**Not Observed**. Survey was not conducted within the blooming period for this species. No occurrence data available within 10 miles of the project site.
Monolopia congdonii San Joaquin woolly-threads	E/-/1B.2	Annual herb in the Asteraceae family found in chenopod scrub and valley and foothill grassland habitats on sandy soils between 195 and 2,625 feet (60 – 800 meters) in elevation. Known to occur in Fresno, Kern, Kings, San Benito, San Luis Obispo, Santa Barbara, and Tulare Counties.	February to May	**Not Observed**. Survey was not conducted within the blooming period for this species. The nearest known occurrence found was 5.5 miles away and recorded in 2013
Stylocline citroleum Oil neststraw	S/-/1B.1	Annual herb in the Asteraceae family in chenopod scrub, coastal scrub, and valley and foothill grasslands in clay soils between 160 and 1,310 feet (50 – 400 meters) in elevation.	March to April	**Not Observed**. Survey was not conducted within the blooming period for this species. The nearest known occurrence found was 3.5 miles away and recorded in 2013

Scientific Name **Common Name**	**Status Fed/State/CNPS**	**Description**	**Blooming Period**	**Field Study Results/Potential for Occurrence**
Stylocline masonii Mason's neststraw	S/-/1B.1	Annual herb in the Asteraceae family found in chenopod scrub and valley and foothill grasslands in sandy soils between 330 and 3,935 feet (100–1,200 meters) in elevation. Known from locations in Kern, Los Angeles, Monterey, and San Luis Obispo Counties.	March to May	**Not Observed**. Survey was not conducted within the blooming period for this species. The nearest known occurrence found was 5.6 miles away and recorded in 1989.

STATUS:

Federal and State Listing Code

- D Delisted
- E Federally or State-listed Endangered
- T Federally or State-listed Threatened
- S Listed as a BLM Sensitive Species

CNPS

- 1A Plants presumed extirpated in California, and either rare or extinct elsewhere
- 1B.1 Plants considered rare, threatened, or endangered in California and elsewhere; seriously threatened in California
- 1B.2 Plants considered rare, threatened, or endangered in California and elsewhere; fairly threatened in California
- 2B.1 Plants considered rare, threatened, or endangered in California, but more common elsewhere; seriously threatened in California
- 4.2 Plants of limited distribution in California; fairly threatened in California

Table B-2: Special-status Animals That May Occur in the Vicinity of the Project.

Scientific Name **Common Name**	**Status Federal/State**	**General Habitat**	**Survey Results/Regional or Nearest Occurrence***
Invertebrates			
Branchinecta lynchi Vernal pool fairy shrimp	T/-	Occurs mainly in vernal pools. Vernal pool composition is highly variable, small clear pools are just as likely as pools formed in road shoulders and alkaline sinks. No known populations exist in Kern County.	**Not Observed/Not Expected.** While suitable habitat exists, the lack of occurrences of this species in Kern County likely precludes this species of existing on site.
Danaus plexippus Monarch butterfly	PT/-	Occur for migration between San Diego and British Colombia. *Asclepias spp*. are used for egg laying throughout the range and are a crucial part of their life cycle.	**Not Observed/Not Expected.** No *Asclepias spp.* observed on the project.
Amphibians			
Spea hammondii Western spadefoot toad	PT/ CSC	Central valley and adjacent foothills, Coast Ranges from Point Conception south to the Mexico border; valley-foothill grasslands and valley-foothill hardwood, shallow temporary pools used for breeding, below 4,472 feet (1,363 meters).	**Not Observed/Low Probability of Occurrence in the Project Vicinity**. Marginal habitat present on the project. The nearest known occurrence found was 0.5 miles away and recorded in 2017.
Reptiles			
Actinemys marmorata Northwestern pond turtle	PT/CSC	Found in streams, ponds, lakes and permanent and ephemeral streams.	**Not Present.** No suitable habitat present. The nearest known occurrence found was 1.8 miles away and recorded in 1989.
Anniella grinnelli Bakersfield legless lizard	-/CSC	Lives mostly underground and burrows in loose, sandy soil in beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Restricted to the southern San Joaquin Valley and the east side of the Carrizo Plain, including within Bakersfield city limits.	**Not Observed**. Suitable habitat present. Potential habitat in the project vicinity. The nearest known occurrence found was 0.5 miles away and recorded in 2020.
Arizona elegans occidentalis California glossy snake	-/CSC	Found in low elevation scrub, grasslands and chaparral habitats.	**Not Observed**. Suitable habitat present. Potential habitat in the project vicinity. The nearest known occurrence found was 2.6 miles away and recorded in 1939.
Gambelia sila Blunt-nosed leopard lizard (BNLL)	E/E,SFP	Found only in the San Joaquin Valley, adjacent Carrizo Plain, Elkhorn Plain, Cuyama Valley, and Panoche Valley; inhabits sparsely vegetated plains, lower canyon slopes, on valley floors, and washes; open grassland, saltbush scrub, and alkali sink are more common habitat types.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat on the site. The nearest occurrence found was immediately northeast of the project across the I-5 and recorded in 1974.

Scientific Name **Common Name**	**Status Federal/State**	**General Habitat**	**Survey Results/Regional or Nearest Occurrence***
Masticophis flagellum ruddocki San Joaquin coachwhip	-/CSC	Found in the San Joaquin Valley in open, dry habitats. Associated with valley grassland and saltbush scrub habitats containing small mammal burrows which are used for refugia and oviposition sites.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat on the site. No known occurrences were found within the vicinity. The nearest occurrence found was 5.3 miles away and recorded in 2017.
Phrynosoma blainvillii Coast horned lizard	S/CSC	Occurs in open areas of sandy soil and low vegetation in valleys, foothills, and semiarid mountains. Found in grasslands, coniferous forests, woodlands, and chaparral, with open areas and patches of loose soil. Often found in lowlands along sandy washes with scattered shrubs and along dirt roads.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat on the site. No known occurrences were found within the vicinity. The nearest occurrence found was 6.0 miles away and recorded in 2007.
Thamnophis gigas Giant garter snake	T/T	Occurs in permanent or semi-permanent bodies of water. Typically found in freshwater bodies of water, will be located in water features associated with farming and irrigation (i.e. canals, drainage ditches flooded fields).	**Not Present**. No suitable habitat present. The nearest known occurrence was 1.8 miles away.
Birds			
Agelaius tricolor Tricolored blackbird	S/T	Forages in grasslands, wetlands, rice fields, croplands, and weedy uplands dominated by mustards and thistles, etc.; breeds in marshes containing heavy growth of bulrushes, cattails, and blackberries; found throughout the Central Valley.	**Not Present/Low Probability of Occurrence in the Project Vicinity**. No suitable nesting habitat on the site. Potential for marginal foraging habitat in farmlands in the vicinity of the project. The only known occurrence found was 1.7 miles away and recorded in 2013.
Anarhynchus montanus Mountain plover	-/CSC	Winter resident in California from September through March. Found on low grasslands, low density shrubland, and plowed fields of the below 3,200 ft (1,000 meters) Historical winter range includes the Central Valley from Colusa County south to Kern County.	**Not Present/Low Probability of Occurrence in the Project Vicinity**. Suitable nesting or foraging habitat on the site. The nearest occurrence found was 2.0 miles away and recorded in 1990.
Anarhynchus nivosus nivosus Western snowy plover	T/CSC	Nests, feeds, and takes cover on sandy or gravelly beaches along the coast, on estuarine salt ponds, alkali lakes, and at the Salton Sea. On the Pacific coast, it nests on barren to sparsely vegetated sand beaches, dry salt flats in lagoons, dredge spoils deposited on beach or dune habitat, levees and flats at salt-evaporation ponds, and river bars.	**Not Present/Low Probability of Occurrence in the Project Vicinity**. Suitable nesting or foraging habitat on the site. The nearest occurrence found was 7.8 miles away and recorded in 1978.

Scientific Name **Common Name**	**Status Federal/State**	**General Habitat**	**Survey Results/Regional or Nearest Occurrence***
Athene cunicularia Burrowing owl	S/C	Inhabits dry, open grasslands, rolling hills, desert floors, prairies, savannas, agricultural land, and other areas of open, bare ground. These owls will also inhabit open areas near human habitation, such as airports, golf courses, shoulders of roads, railroad embankments, and the banks of irrigation ditches and reservoirs.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity**. Suitable habitat for nesting and foraging present. No burrowing owls or owl burrows observed. The nearest known occurrence was 1.6 miles away and recorded in 1990.
Buteo swainsoni Swainson's hawk	S/T	Riparian and sometimes large, isolated trees used for nesting; grasslands and agricultural lands used for foraging; in California, breeds primarily in the Sacramento Valley, with occasional nesting to the south through Kern County; migrate through the Central and San Joaquin Valleys to their wintering grounds in South America.	**Not Observed/Low Probability of Occurrence in the Project Vicinity**. No suitable nesting sites on the project. Low suitable foraging habitat exists across the row-crop farmland south of metropolitan Bakersfield. The nearest occurrence found was 1.8 miles away and recorded in 2016.
Gymnogyps californianus California condor	E/E,SFP	Forages over large expanses of land including but not limited to, grasslands, foothills, coastal mountain ranges. Nests on cliff faces, large trees or manmade structures.	**Not Present.** No suitable nesting or foraging habitat on the site. No occurrence data available within a 10 miles radius of the project.
Coccyzus americanus Yellow-billed cuckoo	T/E	Nests in walnut and almond orchards in California, natural nesting habitat is in cottonwood-tree willow riparian forest. Known populations of breeding western yellow-billed cuckoo are several disjunct locations in California, Arizona, and western New Mexico.	**Not Present.** No suitable nesting or foraging habitat on the site. The nearest known occurrence is 7.8 miles away and recorded in 1922.
Dendrocygna bicolor Fulvous whistling-duck	-/CSC	Typically found in marshes with water less than 20 inches deep. Often nest in flooded rice fields where they also forage.	**Not Present.** No suitable nesting or foraging habitat on the site. The nearest known occurrence is 7.8 miles away and recorded in 1922.
Elanus leucurus White-tailed kite	-/FP	Typically found in savannahs, open woodlands, marshes and desert grasslands.	**Not Present.** No suitable nesting or foraging habitat on the site. The nearest known occurrence is 8.3 miles away and recorded in 1992.
Toxostoma lecontei macmillanorum Le Conte's thrasher	S/CSC	Occurs in dry, sparsely vegetated deserts, grasslands, and foothills. Populations in California are known to occur in Fresno, Kern and Kings counties.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat is present. The nearest known occurrence found was 2.8 miles away and recorded in 1989.
Vireo bellii pusillus Least Bell's vireo	E/E	Occurs in dense shrubby or scrubby habitat, including brushy fields, early successional growth, riverine scrub, coastal chaparral, scrub oak, mottes (isolated patches) of shrubs and trees in prairies, saltcedar stands, and	**Not Present.** No suitable nesting or habitat on the site. Site represents suitable foraging habitat. The nearest known occurrence is 6.0 miles away and recorded in 1907.

Scientific Name **Common Name**	**Status Federal/State**	**General Habitat**	**Survey Results/Regional or Nearest Occurrence***
		mesquite bosques. In arid regions, Bell's vireos are found along streams or in dry arroyos and gulches.	
Xanthocephalus xanthocephalus Yellow-headed blackbird	-/CSC	Occurs in freshwater marshes during the summer. Usually will over winter, in fields, and various cultivated lands.	**Not Present.** No suitable nesting or foraging habitat on the site. The nearest known occurrence is 7.8 miles away and recorded in 1923.
Mammals			
Ammospermophilus nelsoni San Joaquin antelope squirrel	S/T	Occurs in open grasslands but prefers areas that lightly vegetated. Found in saltbush scrub lands mainly in the San Joaquin Valley.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat is present. The nearest known occurrence found was 0.5 miles away and recorded in 1977.
Dipodomys ingens Giant kangaroo rat	E/E	Found in arid communities on the valley floor portions of Kern, Tulare, and Kings counties in scrub and grassland communities in level to near-level terrain with alluvial fan-floodplain soil (fine sands and sandy loams) with sparse grasses and woody vegetation such as iodine bush, saltbush, seep weed, and mesquite.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat on the site. No known occurrences were found within the vicinity. The nearest occurrence found was 4.1 miles away and recorded in 1987.
Dipodomys nitratoides nitratoides Tipton kangaroo rat	E/E	Found in arid communities on the valley floor portions of Kern, Tulare, and Kings counties in scrub and grassland communities in level to near-level terrain with alluvial fan-floodplain soil (fine sands and sandy loams) with sparse grasses and woody vegetation such as iodine bush, saltbush, seep weed, and mesquite.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat on the site. No known occurrences were found within the vicinity. The nearest occurrence found was 1.6 miles away and recorded in 1990.
Eumops perotis californicus Greater western mastiff bat	S/CSC	Open, semi-arid to arid habitats, including conifer and deciduous woodlands, annual and perennial grasslands, chaparral, desert scrub, and urban areas; roosts in cliff faces, as well as high buildings, trees, and tunnels; uncommon resident in southwestern San Joaquin Valley.	**No Roosting Sites Present.** Information on some bat species indicates foraging may occur over 10's of miles from roosting sites. Impacts not expected. The nearest known occurrence found was 7.0 miles away.
Onychomys torridus tularensis Tulare grasshopper mouse	S/CSC	Found in valley grasslands habitats, blue oak savanna, desert associations dominated by annual grasses and California ephedra, alkali sink scrub, saltbush scrub, and upper Sonoran shrub associations, dominated by ephedra.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat on the site. No known occurrences were found within the vicinity. The nearest occurrence found was 4.7 miles away and recorded in 2017.
Perognathus inornatus inornatus San Joaquin pocket mouse	S/-	Found in west-central California in the Upper Sacramento Valley, Tehama County, southward	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.**

Scientific Name **Common Name**	**Status Federal/State**	**General Habitat**	**Survey Results/Regional or Nearest Occurrence***
		through the San Joaquin and Salinas valleys and contiguous areas to the Mojave Desert in Los Angeles, Kern and extreme western San Bernardino counties. Inhabits dry, open, grassy or weedy areas and annual grasslands, savannas, and desert-scrub associations with sandy washes or finely textured soils.	Suitable habitat on the site. No known occurrences were found within the vicinity. The nearest occurrence found was 1.6 miles away and recorded in 1990.
Sorex ornatus relictus Buena Vista Lake shrew	E/CSC	Formerly occupied marshlands of the San Joaquin Valley and the Tulare Basin. Its range has become much restricted due to the loss of lakes and sloughs in the area. It has been recorded from the Kern Lake Preserve area and the Kern National Wildlife Refuge. Current distribution is unknown but likely to be very restricted due to the loss of habitat.	**Not Present**. No suitable habitat present. The nearest known occurrence found was 4.5 miles away and recorded in 1999.
Taxidea taxus American badger	-/CSC	Uncommon resident found through California; in less disturbed grassland and shrubland habitats in San Joaquin Valley.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat is present. The nearest known occurrence found was 5.0 miles away and recorded in 2001.
Vulpes macrotis mutica San Joaquin kit fox (SJKF)	E/T	Found in valley saltbush scrub, valley sink scrub, Interior Coast Range saltbush scrub, upper Sonoran sub-shrub scrub, non-native grassland, and valley sacaton grassland in the Central Valley and adjacent foothills and valleys, infrequently to the outer Coast Ranges; generally not found in densely wooded areas, wetland areas, or areas subject to frequent periodic flooding.	**Not Observed/Moderate Probability of Occurrence in the Project Vicinity.** Suitable habitat on the site. The nearest occurrence found was within the project area and vicinity and recorded in 1975.

STATUS:

Federal
S Listed as a BLM Sensitive Species
D Delisted
E Listed as Endangered
PT Proposed as Threatened
T Listed as Threatened
C Candidate for Endangered Status

State
CSC California Department of Fish and Wildlife Designated Species of Special Concern
C Candidate for Endangered Status
D Delisted
E Listed as Endangered
SFP California Department of Fish and Wildlife Designated Fully Protected
T Listed as Threatened

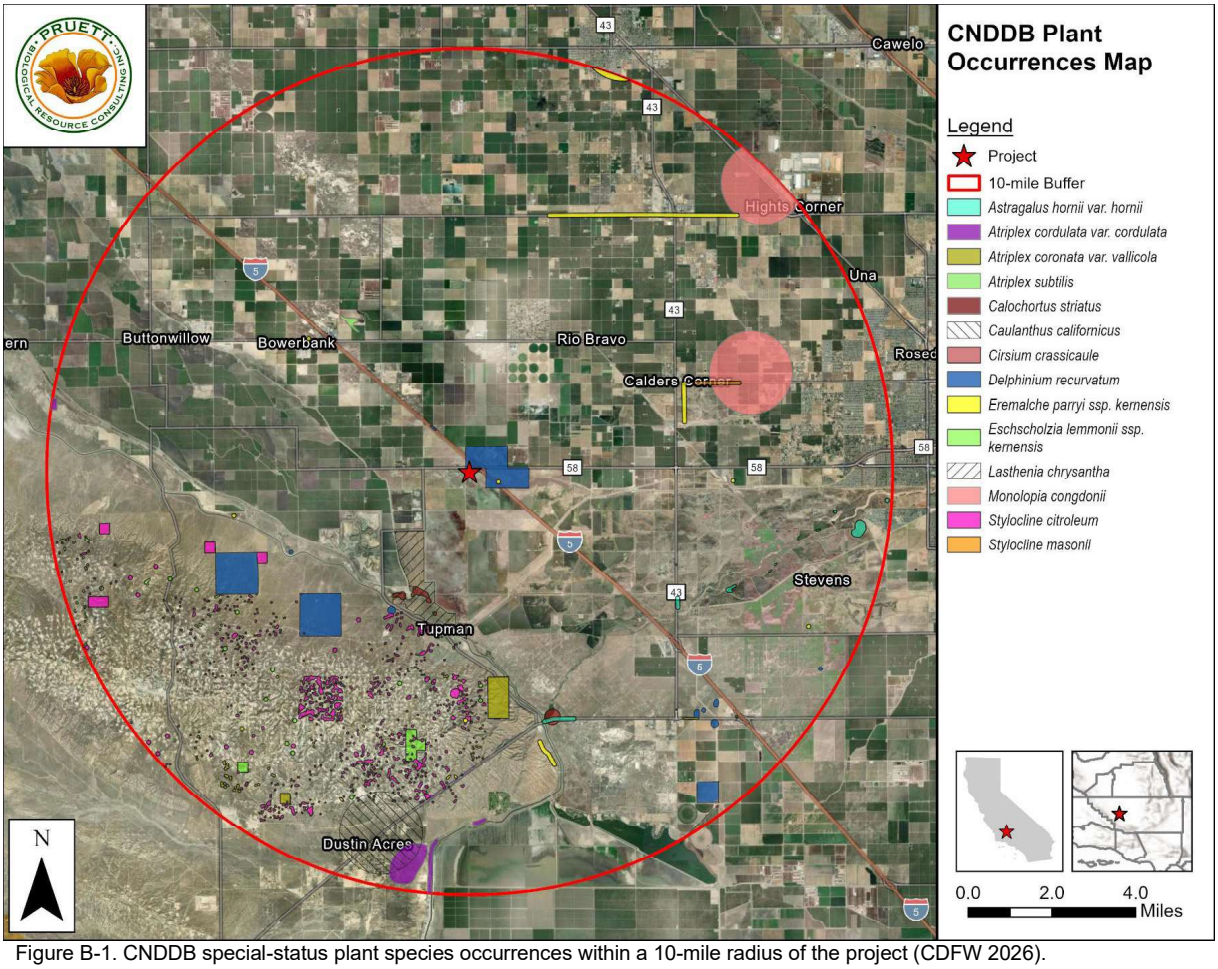

Figure B-1. CNDDB special-status plant species occurrences within a 10-mile radius of the project (CDFW 2026).

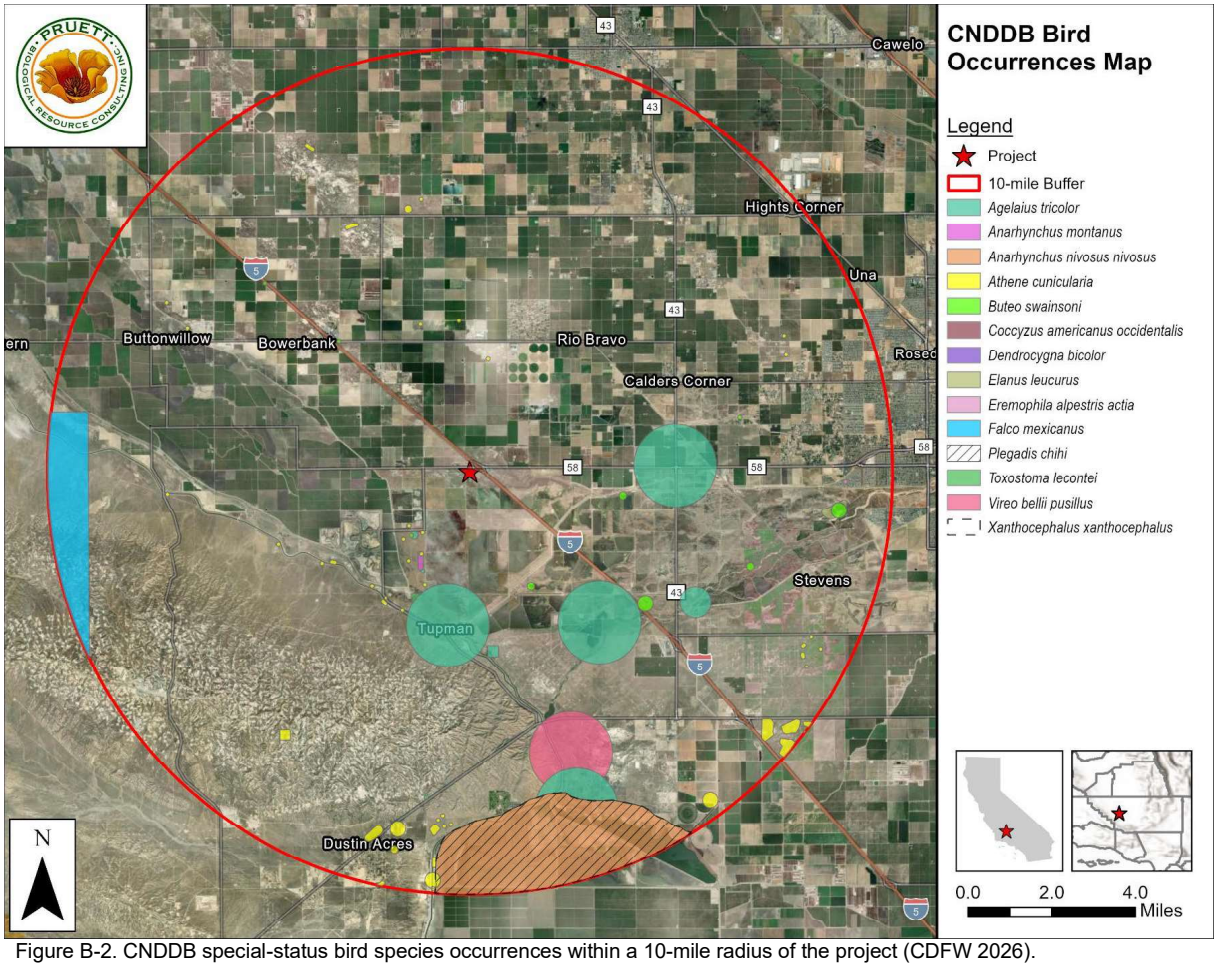

Figure B-2. CNDDB special-status bird species occurrences within a 10-mile radius of the project (CDFW 2026).

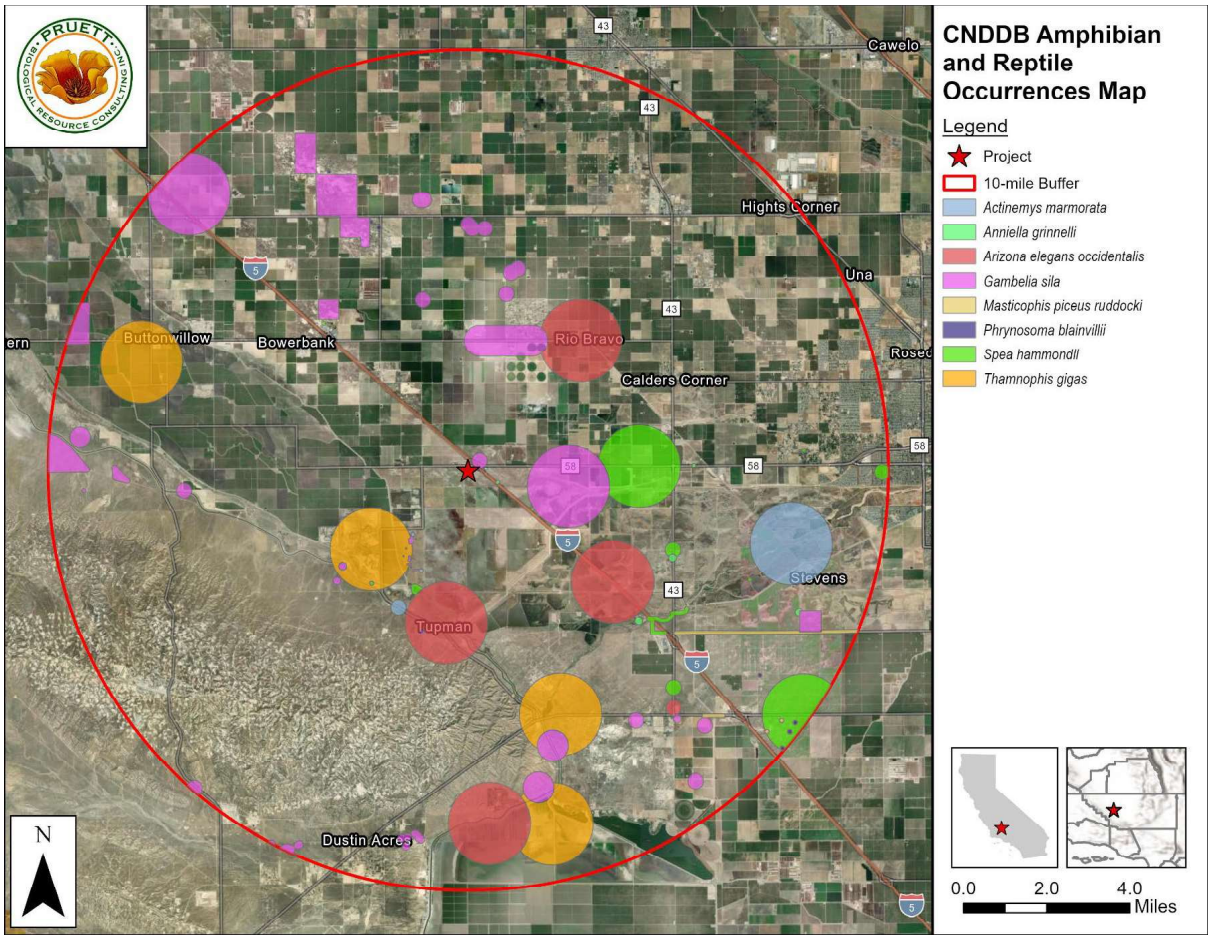

Figure B-3. CNDDB special-status amphibian and reptile species occurrences within a 10-mile radius of the project (CDFW 2026).

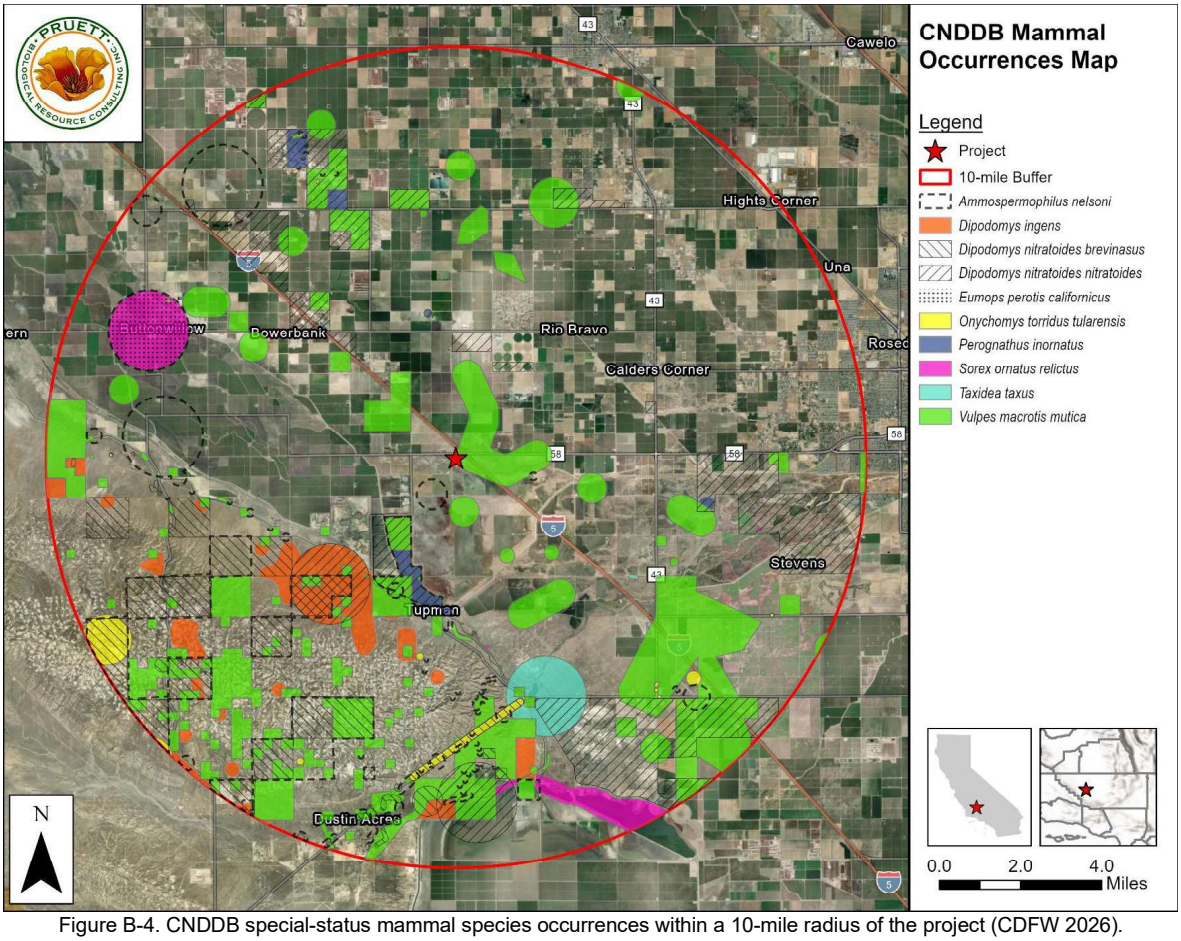

Figure B-4. CNDDB special-status mammal species occurrences within a 10-mile radius of the project (CDFW 2026).

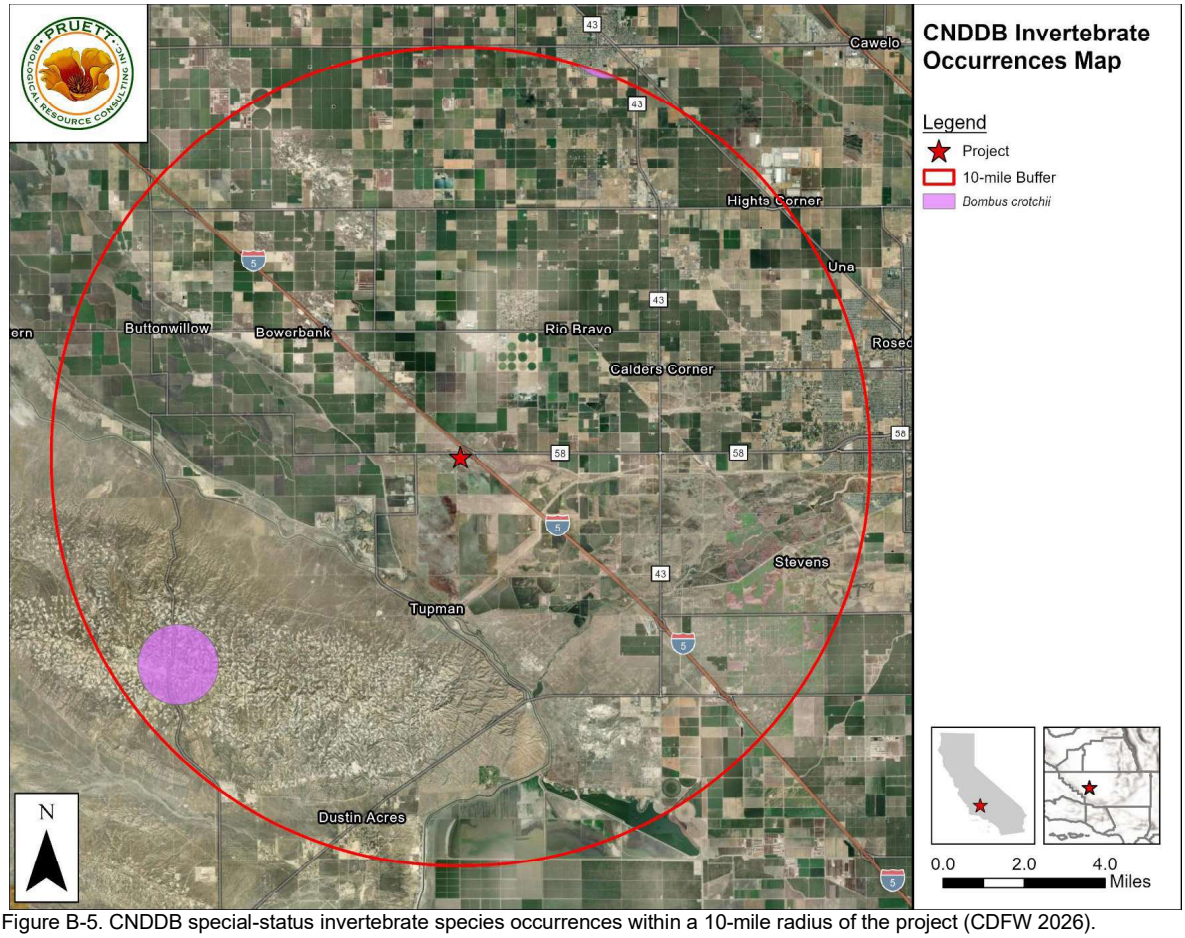

Figure B-5. CNDDB special-status invertebrate species occurrences within a 10-mile radius of the project (CDFW 2026).

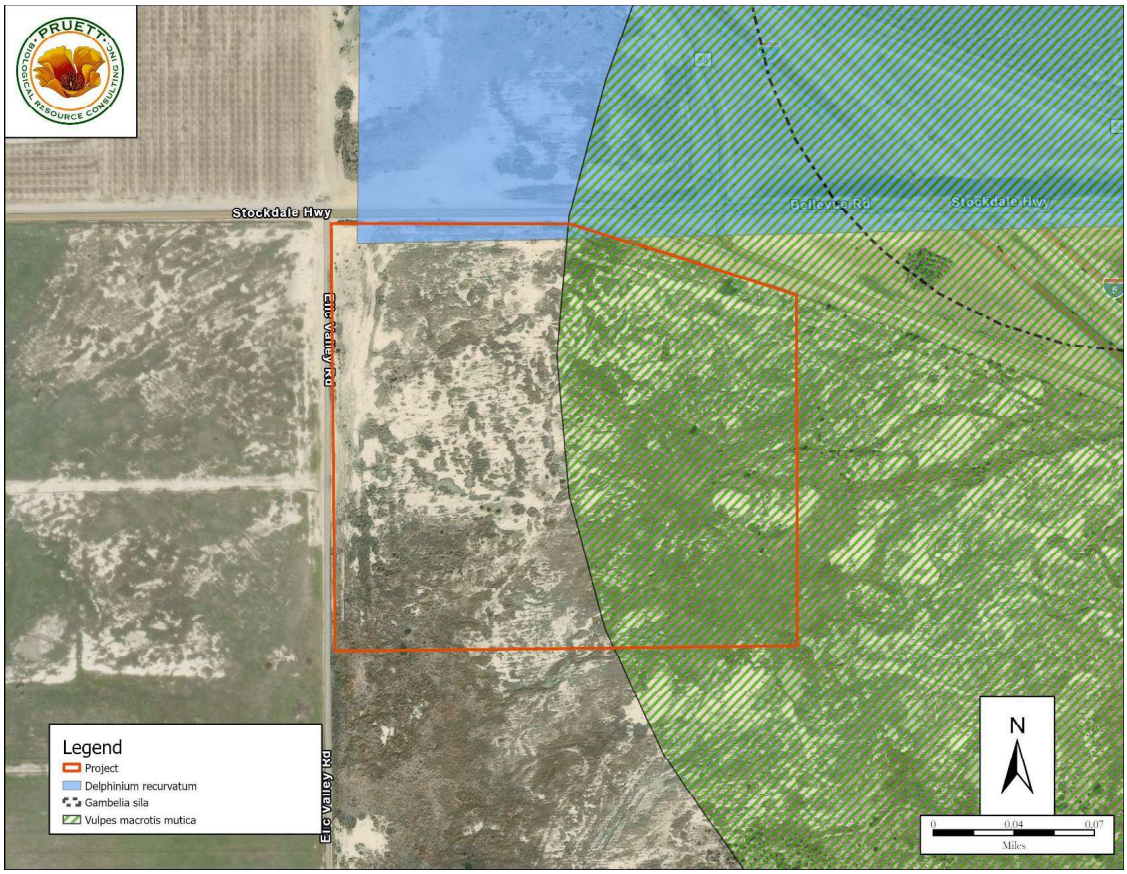

Figure B-6. CNDDB special-status species occurrences that overlap with the project (CDFW 2026).

APPENDIX C

PLANTS AND ANIMALS OBSERVED ON THE PROJECT

FIELD STUDY CONDUCTED
August 3, 2026

Table C-1. Vascular plant species observed during the field study conducted on the project site.

Scientific Name	Common Name
Amaranthaceae	
Atriplex polycarpa	Common saltbush
Salsola sp.	Russian thistle
Asteraceae	
Ambrosia spp.	Bursage
Bassia hyssopifolia	Five-horn smotherweed
Centromadia pungens	Spikeweed
Helianthus annuus	Common sunflower
Isocoma acradenia	Alkali goldenbush
Lactuca serriola	Prickly lettuce
Rhaponticum repens	Russian knapweed
Boraginaceae	
Amsinckia sp.	Common fiddleneck
Chenopodiaceae	
Suaeda moquinii	Mojave seablite
Heliotropiaceae	
Heliotropium curassavicum	Alkali heliotrope
Fabaceae	
Neltuma spp.	Mesquite
Frankeniaceae	
Frankenia salina	Alkali heath
Malvaceae	
Malva leprosa	Alkali mallow
Malva parviflora	Cheeseweed
Poaceae	
Avena sp.	Wild oat
Bromus diandrus	Ripgut
Bromus madritensis ssp. *rubens*	Red brome
Distichlis spp.	Saltgrass
Festuca myuros	Rat-tail fescue
Hordeum vulgare	Farmer's foxtail

Table C-2. Vertebrate animal species observed during the field study conducted on the project site.

Scientific Name	**Common Name**
Birds	
Corvus corax	Common raven
Reptiles	
Aspidoscelis tigris	Western whiptail
Uta stansburiana	Side-blotched lizard
Mammals	
Lepus californicus	Black-tailed jackrabbit

Mitigated Negative Declaration

Appendix B
Groundwater Mounding and Nitrate Loading Report

GURDIAL SINGH TRAVEL CENTER
by LAV Consulting and Engineering
(PP26128)

PD No. 19, Map 121
ZV No. 12, Map 121

Kern County
Planning and Natural Resources Department
Bakersfield, CA

September 2026

MARK R. MAGARGEE, PG, CHG
CONSULTING HYDROGEOLOGIST

GROUNDWATER MOUNDING AND NITRATE LOADING REPORT

COMMERCIAL SITE PD PLAN MAP 121
ASSESSOR'S PARCEL MAP NUMBER 160-030-32
SWC STOCKDALE HIGHWAY AND INTERSTATE 5
BAKERSFIELD, CALIFORNIA

SEPTEMBER 22, 2023

Client:	Ms. Alyssa Allen LAV // Pinnacle Engineering 12418 Rosedale Highway, Suite A Bakersfield, California 93312 (661) 869-0184
Agency:	Kern County Public Health Services Department Environmental Health Division 2700 M Street, Suite 300 Bakersfield, California 93301
Agency Contact:	Mr. Chris Rodier (661) 862-8740
Consultant:	*Mark R Magargee, PG, CHg* 6730 Canaletto Avenue Bakersfield, California, 93301
Project Manager:	Mr. Mark R. Magargee, PG, CHg (661) 205-7000

Mark R. Magargee, PG, Chg
Consulting Hydrogeologist

REGISTERED GEOLOGIST
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1. EXECUTIVE SUMMARY

LAV//Pinnacle Engineering retained *Mark R. Magargee, PG, CHg (MRM)* to prepare this Groundwater Mounding and Nitrate Loading Report for the Commercial Site – Plan Map 121, which is proposed to be located at the southwest corner (SWC) of Stockdale Highway and Interstate 5, Bakersfield, Kern County, California (site). In accordance with the Kern County Public Health Services Department Environmental Health Division (KCPHSD EHD) memorandum, dated November 2, 2020, a Groundwater Mounding and Nitrate Loading Report is required in accordance with the requirements specified in the Kern County Onsite Systems Manual (OSM), revised June 2016, for the siting, design, and construction of Onsite Wastewater Treatment Systems (OWTS) (see Attachment 1 for the KCPHSD EHD Correspondence). The report includes the analysis of the groundwater mounding and nitrate loading for the proposed development of a commerce center on the 26.41 acre parcel to include 31,500 square feet of commercial buildings including a travel center, a convenience store with a service station including underground fuel storage tanks and dispensers serving both automobiles and semi-trucks, four fast food restaurants, and a lube shop. The project proponent will be drilling a water well for the commerce center and will construct a single OWTS for the property.

In accordance with the OSM, the groundwater mounding shall not result in more than a 50-percent reduction in the required minimum depth to seasonally high groundwater, and at no time shall groundwater rise to within 2 feet of trench bottom. For this project, the volume of water discharged is the sum of the food preparation, restroom flushing, hand washing, showering, and facility cleaning. The OSM provides average quantities for each of these and the quantities used in the subject report are consistent with the results of the percolation test and the subsequent design criteria of the OWTS. The groundwater mounding model includes a site specific determination of the depth to groundwater, the physical characteristics such as permeability and specific yield. the estimate of the volume of discharge, and the resulting calculation of the groundwater mounding beneath the site.

The groundwater mounding calculations are based upon an assumed discharge from the 31,500 square feet of commercial buildings including a travel center, a convenience store, four fast food restaurants, and a lube shop with an estimated 260 drain fixture units (DFUs) yielding 5,000 gallons of wastewater per day (gpd), which is 50% of the septic tank capacity, resulting in an annual volume of water discharge through the DFUs of 1,825,000 gallons (5.60 acre-feet per year (afy)). If the entire volume of water is discharged to the subsurface and migrates downward to the groundwater, then a maximum of 1,825,000 gallons per year (5.60 afy) could reach the groundwater table, discounting any reduction in discharge volume resulting from evapotranspiration processes. Based upon the sandy sedimentary sequence with a hydraulic conductivity at an average of 3 to 25 feet/day (f/d) for the unsaturated sediments beneath the site, the specific yield is approximately 20%, and the discharge of 5,000 gallons in a day results in a

calculated maximum mounding of approximately 1.8 feet, which is not a 50 percent reduction in the required minimum depth to seasonally high groundwater and at no time shall groundwater rise to within 2 feet of trench bottom. Therefore, the proposed OWTS at the site complies with the conditions for maximum groundwater mounding specified in the OSM.

Three scenarios for nitrate loading are presented in this report. The first model is based upon the actual hydrogeologic conditions at the site, the second model is a worse case analysis based upon parameters provided by the California Regional Water Quality Control Board – Central Valley Region (Central Valley Water Board), and the third model is a cumulative analysis including along with the subject project all the nitrate loading from existing septic systems within the square mile that subject project is located. The results of the modelling of these three scenarios indicates that the resulting steady state nitrate concentrations for the proposed project satisfies the OSM's limit of 10 milligrams of nitrate as nitrogen per liter (mg-N/L).

MRM has reviewed the United Stated Geologic Service (USGS) Groundwater Ambient Monitoring Assessment (GAMA) groundwater sampling results for Kern County along with the Central Valley Water Board's Central Valley (CV) Salts maps of nitrates in the upper zone of groundwater and the underlying productive zone of groundwater, as well as the CV Salts maps of the assimilative capacity for these zones. While the USGS data demonstrates that the background concentration of nitrates in the site area, which is in the vicinity of the Kern River, is very low, ranging from not detected to 1 mg-N/L and the CV Salts mapping reflects this low concentration, *MRM's* modelling also includes worse-case analysis assuming the Central Valley Water Board preferred background concentration of 5 mg-N/L. To be conservative, *MRM* has included steady state models which assumes that all of the wastewater, with a concentration of 70 mg/L, will eventually migrate to the groundwater aquifer.

The first model is based upon the actual hydrogeologic conditions at the site. Given the parameters modelled for the 26.41 acre (1,150,420 square feet) property that has a width of 1,136 feet perpendicular to the groundwater flow direction, a length of 1,066 feet parallel to the groundwater flow direction, the OSM daily discharge value for 260 DFUs of wastewater of 5,000 gallons, which is 50% of the septic tank capacity, with a nitrate concentration of 70 mg/L into in excess of 1,000-foot thick aquifer, the 6 inches per year of precipitation resulting in a recharge rate of 0.06 inches per year, a hydraulic gradient of 0.001 ft/ft for the distal end of the coarse-grained Kern River Fan aquifer underlying the site, and the literature denitrification of 0.01, the resulting steady state nitrate concentration for the proposed project is 4.79 nitrate as nitrogen per liter (mg-N/L) at the property boundary using an initial actual background concentration of 1 mg-N/L, which satisfies the OSM's limit of 10 mg-N/L over the geographical extent of the property boundaries (see Table 1 – Actual Nitrate Loading Spreadsheet). Therefore, the proposed OWTS at the site complies with the conditions for maximum nitrate loading specified in the OSM when modeled using the actual hydrogeologic conditions.

The second scenario modelled is a worse case analysis based upon parameters provided by the Central Valley Water Board. The Central Valley Water Board document entitled "*Nitrate Loading Assessments – Central Valley Jurisdictional Local Agency Management Programs*" (LAMPS), dated November 19, 2019, includes three checklists for LAMP's to use in evaluation the modelling using either the Hantzsche and Finnemore (1992) equations, which only consider the effect of vertically recharging wastewater on the water table or assessments using the Washington State Department of Ecology (WDOC, 2017) mass balance approaches, that require analysis in detail of local hydrogeology. The Central Valley Water Board parameter checklist requires a detailed discussion of the following modelling input parameters:

a. Provide a reference supporting the value for soil denitrification (d), Background Nitrate Nb, Infiltration Rate (I), Wastewater Loading Rate (W), Wastewater Total Nitrogen (Nw), Average Rainfall Recharge (R), and Resultant Nitrate (Nr) for the proposed project;

b. Provide literature references for use of 1 to 5 mg/L for background nitrate-nitrogen concentration, or provide calculations using a value of 5 mg/L; and

c. Provide calculations for the criteria requirements and provide excel sheet with calculations in resubmittal.

The following summarizes the on-site WDOC mass balance modelling using the Central Valley Water Board's worst case parameters. Given the parameters modelled for the 26.41 acre (1,150,420 square feet) project area that has width of 1,136 feet perpendicular to the groundwater flow direction, a length of 1,066 feet parallel to the groundwater flow direction, the annual precipitation per year resulting in a recharge rate of 0.06 inches per year, a hydraulic gradient of 0.001 ft/ft for the coarse-grained Kern River Fan aquifer underlying the site, using the Kern County OSM values of 5,000 gpd for the daily discharge into the in excess of 1,000-foot thick aquifer and wastewater nitrate concentration of 70 mg/L, the Central Value Water Board worst case denitrification of not detected (ND), and worse case background nitrate concentration of 5 mg/L, the resulting steady state nitrate concentration is 8.82 mg-N/L at the study area boundary, which satisfies the OSM's limit of 10 mg-N/L over the geographical extent (see Table 2 - Worst Case Nitrates Balance Spreadsheet). Therefore, the proposed OWTS at the site complies with the conditions for maximum nitrate loading specified in the OSM using the Central Valley Control Board's worse case parameters.

The third scenario modelled is the cumulative impact of adding this OWTS to the existing OWTS within the square mile that the proposed OWTS is to be located. The site is located within a mile square unincorporated area within the rural area of Kern County that is not served by municipal sewage, The only other wastewater discharge in the area is a similar commercial center located at the SEC of Stockdale Highway and Interstate 5. Theis second commercial center is assumed to have a similar daily discharge of 5,000 gpd. Given the parameters modelled for the 640 acres that has width of 5,280 feet

perpendicular to the groundwater flow direction, a length of 5,280 feet parallel to the groundwater flow direction, a daily wastewater discharge of 10,000 gpd into the in excess of 1,000-foot thick aquifer, the annual precipitation per year resulting in a recharge rate of 0.06 inches per year the annual precipitation per year resulting in a recharge rate of 0.06 inches per year, and a hydraulic gradient of 0.001 ft/ft for the coarse-grained Kern River Fan aquifer underlying the site, the literature denitrification of 0.01, and actual background nitrate concentration of 1 mg/L, the resulting cumulative steady state nitrate concentration is 2.67 mg-N/L within the square mile that the proposed OWTS is to be located within the square mile that the proposed OWTS is to be located, which satisfies the OSM's limit of 10 mg-N/L over the geographical extent (see Table 3 – Cumulative Nitrate Balance Spreadsheet). Therefore, the proposed OWTS at the site complies with the conditions for maximum nitrate loading specified in the OSM. within the square mile that the proposed OWTS is to be located within the square mile that the proposed OWTS is to be located.

2. SITE DESCRIPTION

The project site is located at SWC of Stockdale Highway and Interstate 5, Bakersfield, Kern County, California (the site) (see Figure 1 - Site Location Map). The site is bordered on the north by Stockdale Highway, on the east by Interstate 5, and on the west and south by cultivated farm land. The site is located in the unincorporated area of Kern County that is not served by municipal sewage, five miles to the west the urban area of Bakersfield (see Figure 2 - Site Vicinity Aerial Photograph). The site is located in northwest quarter of Section 6, Township 30 South (T30S), Range 25 East (R25E), Mount Diablo Base and Meridian (MDBM). The property is identified as Assessor's Parcel Number 160-030-32 (see Figure 3 – Assessor's Parcel Map). The 26.41 acre property is planned for development with 31,500 square feet of commercial buildings including a travel center, a convenience store with a service station with underground fuel storage tanks and dispensers serving both automobiles and semi-trucks, four fast food restaurants, and a lube shop. The only other OWTS within a mile of the site is a similar existing commercial center located at the southeast corner (SEC) of Stockdale Highway and Interstate 5 (see Figure 4 - Plot Plan). The project proponent will be drilling a water well for the commerce center and will construct a single OWTS for the property. Because the property is greater than 1,000 feet from a connection to the municipal sewer and will therefore proposed commercial center will be served by an OWTS (see Figure 5 – Facility Diagram Map). The parcel is currently zoned CH-PD for highway commercial-precise development by the Kern County Planning Department (KCPD) (see Figure 6 - Zoning Map).

3. TOPOGRAPHIC SETTING

The site is located at an elevation of 302 feet above mean sea level (MSL) and the topography slopes to the northwest toward the axis of the San Joaquin Valley. The Sierra Nevada is 40 miles to the east of the site and the axis of the San Joaquin Valley is two miles to the west of the site (see Figure 1).

4. CLIMATIC SETTING

Site climate is typical of the southern San Joaquin Valley with hot summers and mild winters, accented with periods of Tule fog when weather conditions permit in the winter. The prevailing wind direction is from the northwest 58 percent of the time, at an average wind speed of 5 to 11 mph at Meadows Field Airport in Bakersfield, California. The project area lies on the valley floor to the west of the Sierra Nevada. The average annual rainfall at the site is approximately 6 inches, as is displayed on annual precipitation map from the Kern County Department of Public Works (KCDPW) (see Figure 7 – Annual Precipitation Map). Most of the precipitation is received during the winter months from December through March. Isohyetal maps obtained from the KCDPW Floodplain Management Department indicate that the 100-year, 24-hour, maximum precipitation is 2 inches. Evaporation is in excess of 80 inches per year, and the thickness of the moisture-deficient zone is in excess of 50 feet (see Attachment 1 for Precipitation, Evaporation, and Evapotranspiration Data). Vegetation is composed largely of native grasses and brush, with oak trees at higher elevations in the uplands surrounding the valley floor. Small mammals capable of surviving in the arid climate characterize the animal life.

5. GEOLOGIC SETTING

The project area is located in the southern portion of the Great Valley geomorphic province (see Figure 8 - Geomorphic Province Map of California). The Great Valley geomorphic province is a northwest-southeast trending valley that is also approximately 400 miles long by 50 miles wide, the southern portion of which is referred to as the San Joaquin Valley. The Great Valley is also commonly referred to as the Central Valley of California. The Central Valley of California covers about 20,000 square miles and is bounded by the Cascade Range to the north, the Sierra Nevada Mountains (Sierra Nevada) to the east, the Tehachapi Mountains to the south, and the Coast Ranges and San Francisco Bay to the west. The valley is a vast agricultural region drained by the Sacramento and San Joaquin rivers averaging about 50 miles in width and extending about 400 miles northwest from the Tehachapi Mountains to near Redding. Generally, the land surface has very low relief and is the result of millions of years of alluvial and fluvial deposition of sediments derived from the bordering mountain ranges. Most of

the valley is at sea level but is higher along the valley margins. The Central Valley is divided into three groundwater basins according to DWR's Bulletin 118 (2016a); the northern one-third of the valley is within the Sacramento River Basin, the central one-third is within the San Joaquin River Basin, and the southern one-third is within the Tulare Lake Basin.

A huge volume of Pre-Tertiary and Tertiary sediments of deep marine, shallow marine, deltaic, and continental origin fill the Central Valley (Farrar and Bertoldi, 1988). The valley fill deposits range in thickness from zero on the eastern edge of the valley to more than 50,000 feet on the western edge (Wentworth et al., 1995). During and since marine deposition, sediments derived from erosion of igneous and metamorphic rocks and consolidated marine sediments in the surrounding mountains have been transported into the valley by streams. The continental sediments at the southern end of the valley have an average thickness of about 2,400 feet (Planert and Williams, 1995). The continental sediments consist mostly of basin-fill or lake deposits of sand and gravel interbedded and mixed with clay and silt. Depending on location, deposits of fine-grained materials (mostly clay and silt) compose as much as 50 percent of the thickness of the valley-fill sediments (Planert and Williams, 1995).

5.1 TULARE LAKE BASIN

A brief description of the evolution of valley sediments and fill within the southern Tulare Lake Basin is described below and includes a basic setting of Pre-Tertiary to Tertiary deposition as it relates to the sediments making up the regional aquifer system in the southern Tulare Lake Basin.

Pre-Tertiary granitic and metamorphic rocks of the surrounding Sierra Nevada and Tehachapi mountains crop out mostly along the eastern and southeastern flank of the valley within the Tulare Lake Basin. In some places, mafic intrusive rocks are included with the granitic rocks. Metamorphic rocks contain metasedimentary, metavolcanic, and undifferentiated metamorphic rocks. These rocks form an almost impermeable boundary for the groundwater basin, but fractures and joints permit small yields of water to wells (Page, 1986).

Near the end of the Late Cretaceous, tectonic movements elevated the Coast Ranges to the west of the Central Valley and created a marine embayment. During the Tertiary, seas advanced and retreated within this southern embayment, resulting in deposits comprised of continental and marine sediments.

During the Pleistocene and Holocene, the seas retreated, and continental deposits from alluvial and fluvial systems were deposited over Tertiary-age marine deposits (Page, 1986). Marine rocks and deposits are, in part, the source rocks for some of the deposits in the groundwater basin of the Central Valley, some containing saline water, migrating into adjacent and overlying continental deposits (Page, 1986). Overall, the overlying continental rocks make up most of the regional aquifer system. The Pleistocene Epoch was dominated by brackish and freshwater lakes within the study area, resulting

in thick deposits of clay. In particular, the Corcoran Clay has been mapped over much of the San Joaquin Valley, and its equivalents have been correlated to clays beneath the Kern and Buena Vista dry lake beds in the southern part of the KCS, as well as the Tulare Lake sediments on the northern boundary of Kern County (Wood and Dale 1964; Croft 1972). This clay makes up a considerable impermeable to semipermeable zone that divides shallower poor-quality water from higher quality water of the regional aquifer system.

Since the Pleistocene Epoch, stream channels, lakes, and rivers have dominated the deposition of sediments in the Central Valley. Alluvial fans have formed on both sides of the valley, especially on the eastern side. The fine-grained detritus carried by streams moved toward the valley axis, leaving the coarse-grained materials closer to the valley margins. The coarse-grained sediments in the fans typically are associated with stream channels. On the eastern side of the valley, these stream channels are large, laterally migrating distributary channels. Over time, shifting stream channels have created coalescing fans, forming broad sheets of inter-fingering, wedge-shaped lenses of gravel, sand, and finer detritus (Page, 1986), which make up the shallow continental water-bearing deposits of the regional aquifer system. Page (1986) identified various depositional environments for the continental sediments, including alluvial fan and deltaic conditions, primarily on the eastern side of the valley, and flood-plain, lake, and marsh conditions on the western side. Consequently, coarse-grained deposits are predominant on the eastern side while fine-grained deposits are predominant within the central and western areas of the subbasin.

5.2 KERN COUNTY SUBBASIN

The Kern County Subbasin (KCS) encompasses a surface area of 1,792,000 acres (2,800 square miles) and contains approximately 32,000 feet (6 miles) of marine and continental sediments (DWR, 2006; Page, 1986), and approximately 40,000,000 acre-feet (AF) of groundwater storage (DWR, 2006). A recent U.S. Geological Survey (USGS) estimate of sediment thickness is 3 miles for the San Joaquin Valley (Faunt et al., 2009). Continental sediments comprise up to approximately 3,400 feet of the material along the Kern River near the town of Tupman (western side of the valley), and the base of the fill is over 18,000 feet deep (Davis et al., 1959).

The lateral boundaries of the KCS (5-022.14), are defined by various jurisdictional and geological segments, as presented by DWR (2016b). The KCS is situated within the southern area of the Tulare Lake Basin and is bounded by the Sierra Nevada on the east, the Tehachapi and San Emigdio mountains, White Wolf Subbasin (5-022.18) on the south, and The Coast Range (Temblor Range) on the west. To the north of KCS are the following subbasins: Kettleman Plain (5-022.17), Tulare Lake (5-022.12), and Tule (5-022.13).

5.3 PROJECT LOCATION

Deposits in the study area include Tertiary alluvial sediments which form a homocline dipping gently to the southwest (see Figure 9 - Geology Map). The sedimentary sequence in the study area, from top to bottom consists of non-marine sands and gravels of the Plio-Pleistocene Kern River series including the Middle Pliocene shallow marine Etchegoin Sand and Lower Pliocene marine Chanac Sand, Upper Miocene marine Santa Margarita Sand, Middle Miocene marine Round Mountain Silt, Lower Miocene marine Olcese Sand, Lower Miocene marine Freeman Silt, marine Eocene Jewett Sand, marine Eocene Pyramid Hill member, marine Eocene Vedder Sand, and non-marine Oligocene Walker Formation. This approximately 20,000 foot-thick tertiary sequence is underlain by granitic rock of the Sierra Nevadan batholith. The Plio-Pleistocene Kern River series consists of an undifferentiated sequence of non-marine braided stream deposits and alluvial fan deposits that consist of poorly sorted coarse sands and gravels.

California Department of Oil, Gas, and Geothermal Resources (DOGGR) records indicate that the site is located within the administrative boundaries of the Bowerbank Oil Field. However, no oil wells or oil production facilities have every been located on the site (see Figure 10 - Oil Field Map).

The site is located in an area of extensive plio-pleistocene faulting. However, there are no known faults beneath the site and no surface evidence of faulting. Two of the most notable faults in the area are the San Andreas Fault situated 50 miles to the west of the leases and the White Wolf Fault situated 50 miles southeast of the site. A lengthy record of Holocene time (last 11,000 years) earthquake activity is observed along these faults including the 1952 Kern County Earthquake, which was a magnitude 7.7 earthquake (see Figure 11 – Historic Seismicity Map of California). Therefore, there is a potential for earthquake damage to structures in the local area (see Figure 12 - Probabilistic Seismic Hazard Map of California).

6. HYDROGEOLOGIC SETTING

The site lies within the San Joaquin Basin Hydrologic Study Area within the Tulare Lake Hydrologic Region (Basin) as defined by the California Department of Water Resources, also known as the Tulare Lake Basin (see Figure 13 – Hydrogeologic Basin Map). This essentially closed basin is situated in the topographic horseshoe formed by the Diablo and Temblor Ranges on the west, by the San Emigdio and Tehachapi Mountains on the south, by the Sierra Nevada Mountains on the east and southeast, and on the north by the Sacramento-San Joaquin Delta and Sacramento Valley. The Tulare Lake Basin only drains north into the San Joaquin River in years of extreme rainfall. The basin setting is described in DWR Bulletin 118 (DWR, 2016a). The southern portion of the valley is internally drained by the Kings, Kaweah, Tule, and Kern Rivers that flow into the Tulare drainage basin including the beds of the former Tulare, Buena Vista, and Kern Lakes. These rivers, which drain the west face of the Sierra Nevada

Mountains, are of excellent quality and provide the bulk of the surface water supply native to the Basin. Imported surface supplies, which are also of good quality, enter the Basin through the San Luis Canal/California Aqueduct System, Friant-Kern Canal, and the Delta-Mendota Canal. Besides the main rivers, the basin also contains numerous mountain streams. Eastside streams are fed by Sierra snowmelt and springs from granitic bedrock. Normally all native surface water supplies, imported water supplies, and direct precipitation percolate into valley ground water if not lost through consumptive use, evapotranspiration, or evaporation.

The Kern County Groundwater Subbasin is bounded on the north by the Kern County line and the Tule Groundwater Subbasin, on the east and southeast by granitic bedrock of the Sierra Nevada foothills and Tehachapi mountains, and on the southwest and west by the marine sediments of the San Emigdio Mountains and Coast Ranges. Principal rivers and streams include Kern River and Poso Creek. Active faults include the Edison, Pond-Poso, and White Wolf faults. Average precipitation values range from 5 inches at the Subbasin interior to 9 to 13 inches at the Subbasin margins to the east, south, and west (see Figure 7).

The site is not located within the boundaries of any municipal of agricultural water district (see Figure 14 - Water District Boundary Map). Surface water and groundwater in the San Joaquin Valley are derived predominantly from the Sierra Nevada to the east, and are transported by five major rivers, the southernmost being the Kern River. The subject site is located approximately two miles to the east of the Kern River. The site is not located within either a Federal Emergency Management Agency (FEMA) 100 or 500-year flood zone (see Figure 15 - Flood Zone Map).

The Kern County Water Agency (KCWA) publishes annual maps showing the depth to water, and groundwater quality for groundwater basins within Kern County. The depth to the regional unconfined aquifer is currently estimated to be in excess of 150 fbg at the site, and the groundwater gradient is anticipated to be to the northwest, toward the axis of the San Joaquin Valley (see Figure 16 - Depth to Groundwater Map and Figure 17 - Groundwater Elevation Map). It is important to note that the nitrate loading model is not sensitive to the depth of groundwater since all wastewater is assumed to migrate to the groundwater table and the steady state impacts of the rise in groundwater table and increase in nitrate concentrations are the observed output. Perched groundwater at depths as shallow as 20 feet is known to be present flanking the current course of the Kern River but is not known to extend to the site. There are no water wells on the site but there are agricultural and domestic water supply wells located within a mile of the site. The groundwater is considered to be potable and suitable for beneficial use (see Figure 18 - Groundwater Quality Map).

6.1 GEOLOGIC STRUCTURE OF THE GROUNDWATER BASIN

The large, asymmetrical, northwestward-trending trough of the Central Valley, and consequently the southern Tulare Lake Basin, is the principal structure controlling the occurrence and movement of groundwater in the area. Groundwater within the KCS is laterally bounded on the east, south, southwest, and west by the surrounding highlands (Sierra Nevada, Tehachapi, and San Emigdio mountains, and Coast Ranges, respectively), and crystalline basement rock. Groundwater flows from the higher elevation recharge areas of the highlands from tributary rivers and streams toward the center axis/trough of the valley and then northward outside of the KCS (Page, 1986), except where fault barriers and extensive recharge zones cause local variation in groundwater flow changes such as in the center of the KCS along the Kern River. Sediments are several thousand feet thick in the central portions and western side of the basin but considerably thinner were deposited on and draped over the Bakersfield Arch which extends from the southeast of Edison to the northwest of Shafter (Bartow, 1991). In general, most of the confinement of ground water occurs near the axis of the valley as a result of more extensive confining beds of the Tulare Formation, such as the Corcoran Clay (Page 1986).

Fold structures are present in the older sediments on the western side of the valley, including the Valley Syncline and several local anticlines, and are concealed by younger sediments (CGS, 2010). Anticlines are mapped in the Lost Hills, Buttonwillow and Semitropic ridges, Elk Hills, and Buena Vista hills (Page, 1986). These structures are oriented toward the northwest, subparallel to the Coast Range and the San Andreas Fault. Page (1986) and DWR (2006), identified the anticlinal folds of the highlands, specifically Lost Hills, as restrictions to groundwater flow within the lowlands and this condition likely applies to other anticlines in the subbasin.

Numerous faults are mapped within the KCS area and have been grouped by age of displacement (CGS, 2010). Most of the active faults within the KCS are located on the east, south, and southeastern sides of the subbasin. Many of the faults are oriented toward the northwest, parallel to the San Andreas Fault, while several faults are oriented northeasterly. In the southern part of the valley, the White Wolf Fault is a barrier to groundwater movement, as is the Pond-Poso Fault and Edison Fault along the northeastern and southeastern portions of the valley, respectively (DWR, 2006). Existing literature is not clear about the number of the faults in the subbasin that are barriers to groundwater flow, although Faunt et al., (2009) included four northwest-trending “potential horizontal flow barriers” in the groundwater Central Valley Hydrologic Model (CVHM) near Semitropic Ridge and Buttonwillow Ridge and east toward Pond-Poso Fault.

The base of fresh groundwater is commonly defined as the bottom of the basin, and measurements of specific conductance (SpC) and/or total dissolved solids (TDS) are commonly used to define fresh groundwater. The USGS (Page, 1973) utilized the SpC value of 3,000 micromhos per centimeter (µmhos/cm) or microsiemens per centimeter (µS/cm) and considered that value to be generally equivalent

to a TDS concentration of 2,000 milligrams per liter (mg/l), which can be a limiting factor for irrigation. The conversion factor from SpC to TDS used for this determination was 0.67, which is midway between the typical range of 0.55 to 0.75 (Hem, 1985), and is dependent on the composition of the groundwater. The bottom of the fresh groundwater is quite variable in the KCS subbasin (>3,000 micromhos), as determined by Page (1973), and ranges over 4,000 feet.

6.2 AQUIFERS AND AQUITARDS

Groundwater in the KCS is found primarily in an alluvial aquifer system that is heterogeneous in texture and occurs under a variety of conditions, including shallow, perched groundwater on the western side of the basin, deep unconfined to semiconfined groundwater on the eastern side, and deeper confined groundwater beneath the Corcoran Clay in the central area and western central side. Along the eastern margins of the KCS, there are confined aquifers in semi-consolidated rock such as the Pyramid Hills, Vedder Sands, Santa Margarita Sandstone, and Olcese Sands. These aquifers are not considered a part of the regional alluvial aquifer system but are within the boundaries of KCS as defined by DWR and make up principle sources of groundwater along the eastern and southeastern edges of production in the KCS. Water quality further differentiates the alluvial groundwater system of the KCS with lower concentrations of TDS on the eastern side and higher TDS on the western side, especially in the shallow, perched groundwater.

The production horizons (isolated confined and unconfined zones in the eastern half) of the KCS aquifer are generally thick and consist of interbedded layers of gravel, sand, silt, and clay of the continental deposits of the Kern River and Tulare Formations. The interbedding increases toward the center of the valley along with the amount of fine-grained lakebed deposits. Groundwater wells extend to depths of more than 1,000 feet (Page, 1986), and the maximum thickness of freshwater deposits is calculated at about 4,400 feet, occurring at the south end of the valley (Page, 1986).

The water-bearing units in the subbasin are primarily continental deposits of Tertiary and Quaternary age with some older marine deposits. From oldest to youngest, the deposits include: Pyramid Hills and Vedder Sands, the Olcese Sand and Santa Margarita Sandstone, Chanac Formation, Etchegoin Formation, San Joaquin Formation, the Tulare Formation (western portion of the subbasin) and laterally equivalent Kern River Formation (eastern portion of the subbasin), older alluvium, and younger alluvium and laterally equivalent flood basin deposits (Page, 1986; DWR, 2006). Confining or semi-confining fine-grained beds in the KCS include the Freeman-Jewett Silt, Round Mountain Silt, and Corcoran Clay of the Tulare Formation and other clay layers.

6.3 DESCRIPTION OF THE AQUIFERS

The KCS groundwater system is dominated by alluvial/fluvial materials on a basin-wide scale and produce a complicated, heterogenous grouping of aquifers. Although formations can be mapped across

the basin, much of the material is not distinctive in the subsurface and designation of a particular formation is difficult, except for the Corcoran Clay which is a member of the Tulare Formation. A discussion of the geologic formations is provided below to explain their general context in relation to the aquifer system.

The Oligocene Pyramid Hills and Vedder Sands are interbedded sandstone and siltstone deposited in a shallow to deep marine environment and in a limited non-marine environment. They may produce fresh groundwater on the east and southeast sides of the subbasin (Page, 1986).

The Miocene Olcese Sand and Santa Margarita Sandstone are current sources of drinking water in the northeastern portion of the subbasin where they occur as confined aquifers (KTWD, 2016). The origin of the Miocene Olcese Sand and Santa Margarita Sandstone varies from continental to marine going from east to west across the subbasin (Scheirer, et al, 2007). The Miocene Olcese Sand ranges in thickness from 600 to 1,000 feet and consists of unconsolidated medium- to coarse-grained sand containing a few pebble and siltstone beds. The formation is exposed in the Poso Creek area (Page, 1986) and is utilized by the Olcese Water District in the Kern River Canyon. The Santa Margarita Sandstone ranges in thickness from 200 to 600 feet and consists of coarse-grained sand (DWR 2006), and includes an upper bed of fine, silty, well sorted gray sand and a lower bed of brownish-gray and brown fossiliferous micaceous sandy siltstone. According to Page (1986), the sandstone is a major aquifer that reportedly yields as much as 1,950 gallons per minute (gpm) to wells. Croft (1972) reported that the formation also yields water to wells in the foothills southeast of Bakersfield. The Round Mountain Silt is an aquitard that separates the Miocene Olcese Sand from the Santa Margarita Sandstone and acts as a confining unit for the Miocene Olcese Sand (KTWD, 2016). This silt unit consists mostly of a gray and brown siltstone that contains beds of diatomite and silty sand (Page, 1986), and ranges in thickness from 0 to about 200 feet.

The Mio-Pliocene Etchegoin Formation varies considerably, ranging from clay and silt to sand, gravel, and sandstone. It ranges in thickness from a few tens of feet to more than 2,000 feet. Several wells near the foothills and a few deep wells in the valley derive fresh water from the Etchegoin; however, its depth is more than 3,000 feet beneath most of the valley and is limited to deep well production (Page, 1986).

Overlying the Etchegoin Formation is the Pliocene San Joaquin Formation of marine deposition. It contains silt and silty sandstone, with a conglomerate at the base of the formation. In the deep subsurface northeast of the Kettleman Hills, the formation is considered a shoreline deposit because the material is coarser and more permeable than in the Kettleman Hills area and yields fresh water to many wells. The San Joaquin Formation is the youngest marine deposit in the Central Valley (Page, 1986), representing the end of marine deposition in this area. Overlying sediments were deposited by alluvial, fluvial, and lacustrine processes.

The Tulare Formation is Plio-Pleistocene in age, and in conjunction with the Kern River Formation (Mio-Pliocene to possibly early Pleistocene), represents a west-east facies change across the subbasin. The Tulare and Kern river formations are moderately to highly permeable and are major freshwater sources within the KCS (Page, 1986; SWSD, 2012).

The Tulare Formation (western subbasin) contains up to 2,200 feet of interbedded, oxidized to reduced sands, gypsiferous clays, and gravels derived primarily from Coast Range sources. The permeable deposits of the Tulare Formation are divided into upper and lower units, separated by the Corcoran Clay member of the formation. Groundwater beneath the Corcoran Clay is typically confined to semiconfined (Page, 1986; SWSD, 2012). In addition to its confining properties, laboratory tests indicate that the clay is highly susceptible to compaction (Faunt, et al., 2009).

The Corcoran Clay occurs laterally in the north subbasin (~34 miles wide in extent) from Delano to Lost Hills and narrows to the south just to the west of the Kern River banking facilities to about 3.5 miles wide; it is common in the south subbasin from Buena Vista Lake Beds to just east of Arvin and DiGiorgio (~31 miles wide in extent). In the south subbasin, the Corcoran Clay is present at depths between 250 and 650 feet (DWR, 1981). Within the central area of the subbasin between the Kern River and Highway 46, the depth to the Corcoran Clay varies from 300 to 450 feet. Further north to the county line, the depth varies from 200 to 750 feet. The Corcoran Clay, most notably the modified E-clay (Page, 1986) is generally very fine grained; however, isolated, coarser zones are possible, particularly where the clay is less than 20 feet thick. The thickness of the clay is as much as 100 feet in a small area of the southern subbasin but typically varies between 20 and 40 feet. In the northern subbasin, the clay might be as thick as 60 to 80 feet in isolated areas, but the thickness typically varies between 10 and 30 feet. The Corcoran Clay does not exist under the Kern Alluvial Fan (Kern Fan), where the shallow unconfined layers are separated from deeper layers by an intermediate zone of interbedded sands and silts which retard vertical groundwater flow and create an increase in semi-confinement with depth. The Corcoran Clay is also not present in the eastern/northeastern part of the subbasin (Faunt et al., 2009).

The Kern River Formation includes from 500 to 2,000 feet of poorly sorted, lenticular deposits of clay, silt, sand, and gravel derived from the Sierra Nevada. The Kern River Formation crops out in the east KCS and reaches its maximum thickness of 2,600 feet in the subsurface west of mapped outcrops (Bartow and Pittman, 1983). The formation consists mostly of poorly sorted fluvial sandstone and conglomerate with interbeds of siltstone or mudstone that becomes finer grained northward and westward. Some of the thicker siltstone or mudstone interbeds may represent deposits of small ephemeral lakes or ponds (Bartow, 1983). The Kern River Formation is coarsest in its easternmost exposures, generally the area south of the Kern River, where the composition includes a cobble conglomerate with boulders near the base and pebbly sandstone (Bartow and Pittman, 1983). Two oil-producing zones occur in the lower part

of the formation where it is believed to have migrated to the Kern River Formation from older marine sediments (Bartow and Pittman, 1983).

The Kern River Formation unconformably overlies the Chanac Formation and may be contemporaneous with the Etchegoin, San Joaquin, and the Tulare formations (Bartow, 1983 and 1991); however, Graham and others (1988) concluded that the Kern River Formation predates the Corcoran Clay, which has a basal age of about 725,000 years. Radiometric dating of a volcanic ash layer near the top of the Kern River Formation at the Kern River oilfield may agree with the aforementioned basal age; however, others dated this ash bed at 6 million years which would place the Kern River Formation solely in the Miocene (Scheirer et al., 2007). Nevertheless, the gradational relationship between the Kern River Formation and seemingly younger units such as the Etchegoin, San Joaquin, and Tulare formations would have to be reexamined. For ease of discussion within the hydrogeologic conceptual model, the correlation of the top of the Kern River Formation will be placed at the base of the Corcoran Clay.

Older alluvium and terrace deposits overly the Tulare and Kern River formations. These deposits also make up a portion of the regional aquifer system. They are composed of up to 250 feet of Pleistocene-age lenticular deposits of clay, silt, sand, and gravel that are loosely consolidated to cemented. These deposits are moderately to highly permeable and yield sufficient water to wells. They are often indistinguishable from the underlying Tulare and Kern River formations (DWR, 2006).

The Holocene-age younger alluvium and flood basin deposits vary in character and thickness in the subbasin. Along the eastern and southern subbasin margins, these younger deposits consist of up to 150 feet of interstratified and discontinuous beds of clay, silt, sand, and gravel. In the southwestern portion of the subbasin, the deposits are finer-grained and less permeable as they grade into fine-grained flood basin deposits underlying the historic lakebeds of Buena Vista and Kern lakes in the southern portion of the subbasin. The flood basin deposits consist of silt, silty clay, sandy clay, and clay interbedded with poorly permeable sand layers. These flood basin deposits are difficult to distinguish from underlying fine-grained older alluvium (Page, 1986; DWR, 2006).

6.4 PHYSICAL PROPERTIES OF THE AQUIFERS AND AQUITARDS

Aquifer parameters within the KCS are available from both well pumping tests and calibrated groundwater models. Aquifer properties reported herein include hydraulic conductivity which is a function of an aquifer's ability to move or transmit water (transmissivity) through an aquifer of a given saturated thickness, and the specific yield (unconfined systems) and storage coefficient (confined systems), which are functions of an aquifer's ability to store and release water from storage (storativity).

Aquifer data derived from pumping tests were taken from two sources: 1) relatively short (1.5- to 5-hour) pumping tests by the USGS at irrigation wells during the late 1950s and 1960 (McClelland, 1962), and

2) from constant rate pumping tests from engineering consultants in the 2000's (Todd, 2018). The depth of these test wells varied from 98 to 1,500 feet below ground surface (bgs) (median: 650 ft bgs), and pumping rates varied from 44 to 4,480 gpm (median: 2,500 gpm). The analysis included the use of water level recovery data from pumping wells and water levels from observation wells. From these tests, the hydraulic conductivity was estimated and ranges from 3 to 250 feet per day (ft/d; median: 60 ft/d), which is consistent with published ranges for clean, medium- to coarse-grained sand (Heath, 1983), or for a fine sand to coarse gravel (Schwartz & Zhang, 2003). These values also fall within the range of the groundwater models that were partially calibrated with these data (C2VSim; CVHM; Todd, 2018; Todd, 2017).

The Corcoran Clay of the Tulare Formation, is most commonly known for its fine-grained beds; however, lithology does vary from fine (clay and silt) to coarse (sand) texture (Page, 1986; Faunt et al., 2009). Faunt et al., (2009) compiled and estimated horizontal hydraulic conductivities within the range of 0.0024 to 33 ft/d, which is within the range of silt to fine/medium sand (Heath, 1983). A range of vertical hydraulic conductivity was estimated from permeameters and field tests between 6.6×10^{-6} ft/d to 1.5×10^{-3} ft/d (Faunt et al., 2009), representing a potential vertical anisotropy range of 3.6×10^{2} to 2.2×10^{4}. As noted by Faunt et al., (2009) laboratory permeameter tests may have underestimated the hydraulic conductivity while field testing may have overestimated hydraulic conductivity due to potential for intra-borehole flow across the clay. Additionally, recent inelastic compaction of the Corcoran Clay in areas of subsidence may have further reduced vertical hydraulic conductivity (Faunt et al., 2009).

6.5 AQUIFER STORAGE AND SPECIFIC YIELD

Storage of an aquifer is primarily described and quantified by the storativity or the volume of water released from storage per unit surface area of the aquifer per unit decline in hydraulic head. It is important to note that while storativity applies to both confined and unconfined systems, it can be further simplified for these two systems. Storativity accounts for aquifer compression and water expansion (specific storage components), which are the primary factors for estimating storage in confined systems; thus, for confined systems, the specific storage or storage coefficient is most often reported. In contrast, for unconfined systems, the specific yield or effective porosity (gravity-driven dewatering of an aquifer) better represents storativity because aquifer compressibility and water expansion are somewhat negligible in unconfined systems. For unconfined systems, specific yield is most often reported, and is a function of porosity and specific retention.

For confined systems, the aquifer compressibility of the storage coefficient can be further defined as elastic and inelastic skeletal specific storage, where inelastic storage will be lost once compression and dewatering occur. It is estimated that in the Central Valley, the inelastic specific storage typically is 30 to several hundred times larger than the elastic skeletal specific storage (Faunt et al., 2009; Ireland et al., 1984). Where fine-grained deposits with inelastic storage are thick in the aquifer system, water released

could be a major source of water, but could also result in a permanent loss in storage capacity of fine-grained sediments.

Specific yield of unconfined zones and the storage coefficient of confined zones within the subbasin have been estimated by laboratory testing of sample cores, calculation based on lithology type, and groundwater model calibration (Dale, 1966; Davis et al., 1959; Davis et al., 1964; Faunt et al., 2009; DWR, 2013; Todd, 2017 and 2018). The range 0.02-0.40 is within the range of values published for similar grain sizes and lithology (Heath, 1983; Morris and Johnson, 1967).

6.6 AQUIFER RECHARGE AREAS

Significant direct recharge to groundwater in the subbasin occurs through managed recharge and water banking (storage) projects; as well as unmanaged recharge through natural waterways, unlined spill basins and regulating (balancing) reservoirs, and unlined canals. Numerous sources of water are recharged by various projects, including local surface water (Kern River, Poso Creek, and other drainages) and imported water (State Water Project [SWP] and Central Valley Project [CVP]). Additional sources of unmanaged recharge include agricultural land where excess irrigation water percolates below the root zone, wastewater treatment spreading areas, and urban drainage spreading areas.

Since the late 1980s, large-scale groundwater recharge/banking operations have been constructed along the Kern River. Given the permeable nature of sediments within the Kern River Fan, most of the enhanced recharge projects involve surface spreading through ponds, low-lying fields, or basins. Some projects are dedicated to the replenishment of the groundwater basin, while other projects store surplus SWP and CVP water for subsequent extraction; and some banking projects do both (Todd, 2017).

The Soil Agricultural Groundwater Baking Index (SAGBI), can further estimate groundwater recharge suitability to quantify recharge of deep percolated applied irrigation water and potential recharge from future managed recharge within the KCS. The California Soil Resource Lab at University of California Davis has developed an online application (https://casoilresource.lawr.ucdavis.edu/sagbi/) to present the SAGBI, which estimates groundwater recharge suitability based on five major factors: deep percolation, root zone residence time, topography, chemical limitations, and soil surface condition. The application includes mapping coverage of the SAGBI and indicates a moderately good to excellent rating for the Poso Creek alluvial fan in the north central subbasin, the Kern River alluvial fan in the central area, and in much of the southeastern to southwestern corners of the subbasin. SAGBI ratings are moderately poor to very poor along the eastern margin, central western margin, as well as the center of the valley from the former Kern and Buena Vista lake beds, north along the Goose Lake Slough to the Tulare Lake Bed. While moderately good to good SAGBI is shown for much of the western margin, this area is underlain by marine sediments and is not likely to be a useful area for recharge. The SAGBI ratings generally agree

with mapped soil data where higher rated SAGBI soil corresponds with moderate to high infiltration soils. Note that an abrupt east-west alignment of good versus poor SAGBI occurs in the southern central KCS and is likely due to the methods and results of historical soil surveys.

Groundwater discharge areas in the KCS are limited due to the depth of usable groundwater, typically greater than 100 feet throughout the subbasin. Shallow, poor-quality groundwater does occur in the west central and southern areas. These shallow groundwater areas may support salt-tolerant vegetation. Effects of a shallow water table and evapotranspiration may discharge poor quality shallow groundwater from these areas to the surface. Historically, flowing wells were present throughout much of the valley floor (Mendenhall, 1916), including the Buena Vista and Kern lakes and the area to the north (>180 square mi), and from Buttonwillow north beyond the county line (>400 square mi). Over 100 flowing wells were identified in 1905 and reductions in flow were recognized in the following years. According to the USGS groundwater model (Faunt, 2009), the Kern River is a groundwater discharge area along a nominal 7-mile reach within Bakersfield, east of Highway 99; however, the city of Bakersfield measures flow at six weirs along the river across the valley and shows an overall loss of flow (seepage) from the Kern River.

6.7 SURFACE WATER BODIES

The most important source of naturally occurring surface water is the Kern River, which has been regulated by the Isabella Dam and Reservoir since 1954. The dam and reservoir are operated by the U.S. Army Corps of Engineers and the distribution of water is administered by the Kern River Watermaster. The Kern River is approximately 164 miles long and is fed by rain and snowmelt from the Southern Sierra Nevada, including Mount Whitney. The last 35 to 40 miles of river crosses the KCS. The subject site is located two miles to the northwest of the Kern River (see Figures 1 and 2). Similarly, Poso Creek flows from the Sierra Nevada approximately 20 miles to the north of the Kern River and terminates in a distributive fan in the center of the basin. Local streams, many of which are ephemeral, provide additional local surface water during the wet season and during above normal and wet water years. A very small percentage of minor stream runoff is collected and used for irrigation; the majority of these irregularly occurring flows likely serve to recharge local groundwater basins (Kennedy and Jenks, 2011).

6.8 GROUNDWATER QUALITY

Natural groundwater quality varies significantly across the KCS due to geologic and hydrologic conditions of the watershed and aquifers. In the western third of the KCS, marine-derived sedimentary formations yield a high TDS, greater than 2,000 ppm, poor-quality groundwater (Wood and Davis, 1959 and 1964; Wood and Dale, 1964). In contrast, groundwater in the central and eastern thirds of the KCS is produced from continental sedimentary formations derived from igneous and metamorphic rocks of the Sierra

Nevada. Moreover, runoff from the Sierra Nevada contains a much lower TDS and this recharge contributes to the higher quality groundwater on the eastern side of the KCS (Kennedy and Jenks, 2015).

Natural groundwater quality can be easily impacted by anthropogenic activities such as agricultural, industrial, and urban land use; over-pumping of groundwater; artificial recharge of groundwater, and the presence of abandoned or improper destruction of wells. Conversely, groundwater remediation activities are intended to restore the natural quality.

General water quality data are briefly described below in the context of the KCS Basin Setting. The general water quality can be associated with either the drainage areas, rock chemistry types, and natural chemistries from which water is moving, as well as anthropogenic causes related to agricultural development, over-pumping, and recharge.

Most of the groundwater in the KCS is one of three types:

- Low-moderate TDS, calcium-bicarbonate (Ca-HCO3) water
- Moderate-high TDS, sodium/calcium-sulfate (Na/Ca-SO4) water
- High-very high TDS, sodium-chloride (Na-Cl) water

The areas and zones where mixing of these distinct types of groundwater occur are characterized by intermediate water chemistry.

The chemistry of the low TDS, Ca-HCO_3 groundwater resembles the chemistry of Kern River water, the main source of recharge for much of the subbasin. This water is referred to as east-side water because it is characteristic of surface waters which drain from the granitic Sierra Nevada to the east. East-side water recharges the subbasin along the Kern River recharge mound and along Poso Creek and is widespread across the interior of the subbasin to depths of 600 to 700 feet bgs.

The chemistry of the moderate-high TDS, Na/Ca-SO_4 groundwater is similar to the chemistry of surface water runoff that drains from outcrops of Miocene-Pliocene marine sediments and is primarily found along the west subbasin margin for more than 60 miles. This type of water is referred to as west-side water based on the theory originally advanced in the early 1960s by the USGS that the Miocene and younger marine sediments of the Coast Ranges are the source of poor groundwaters observed along the western margin of the KCS. Far less runoff occurs on the west side than from the east side and less groundwater recharge is provided by the west side. As such, westside SO_4 groundwater is limited in comparison to the HCO_3 groundwater from the eastside of the KCS.

The high-TDS, Na-Cl groundwater is generally found in the deeper parts of the subbasin, regardless of what the type of groundwater it underlies. This saline groundwater is likely connate and was trapped during the deposition of the marine sediments.

Salinity (EC/TDS) and Nitrate, and Arsenic are the key constituents examined in this section as the with Salinity and Nitrate commonly used to identify areas that may have been impacted by irrigated agriculture, while Arsenic is a common naturally occurring constituent within the KCS. All constituents are discussed in terms of the Water Quality Objectives (WQOs) from the Tulare Basin Plan (Central Valley Regional Water Quality Control Board [CVRWQCB], 2016).

6.8.1 Salinity

TDS was selected as the primary index of salinity in groundwater and is defined as the total quantity of inorganic salts and organic matter that remain after water from a sample has been evaporated. Because numerous individual constituents contribute to TDS, waters of similar TDS concentrations may differ in the composition of their salt loads. SpC is an indirect measure of TDS and can be used as a surrogate where the TDS values equal approximately 2/3 of the SpC value.

As described above, natural sources contributing to TDS in the KCS vary from west to east in both TDS concentrations and the chemistry associated with salt loads. As well as natural sources of salts, anthropogenic sources such as sewage, industrial wastewater, oilfield produced water, and deep percolation of irrigation water, affect salt concentrations in groundwater.

Groundwater recharge projects that apply water from the Kern River or the Friant-Kern Canal for direct recharge may result in percolation of recharged water that is of higher quality than the underlying groundwater. Thus, recharge through unlined canals and recharge ponds may dilute the salt concentration in the groundwater. However, the overall mass of salt stored in the subbasin will increase in areas of the KCS where there is no outlet to continuously remove salt mass. Historical TDS concentrations are above the recommended secondary maximum contaminant level (SMCL) in the western third of the KCS, north of the Bakersfield and southwest of the Kern Fan. Historical concentrations are above the upper SMCL and short term SMCL in the southeast, south, and northeast areas of the KCS.

6.8.2 Nitrate

Nitrate (NO_{-3}) is a form of nitrogen that can be produced naturally by the atmosphere or by decomposing organic matter. Naturally occurring nitrate concentrations are generally less than 10 milligrams per liter as nitrogen (mg/L-N), and generally do not exceed 20 mg/L-N in groundwater (TODD, 2005; Hounslow, 1995). However, nitrate concentrations can increase due to the application of nitrogen fertilizers, runoff

from feedlots or dairies, percolation of wastewater and food processing waste, and leachate from septic systems (Harter, T. et al., 2012). Treated wastewater is regulated by the Regional Water Quality Control Boards (RWQCB) under specific individual waste discharge requirements (WDRs), and point sources discharging to surface water are regulated by the National Pollutant Discharge Elimination System (NPDES) under the Federal Clean Water Act. Recharge from septic systems is not thoroughly measured or estimated in the KCS. Recharge from wastewater generated by food processing, confined animal facilities, and other industries is also significant, but is also generally regulated under individual WDRs.

Two primary drinking water standards (maximum contaminant levels) are available for nitrate and are based on the reporting units by the laboratory: 10 mg/L for nitrate as nitrogen, and 45 mg/L for nitrate as nitrate (CCR, 2018). These MCLs are equivalent where the former accounts only for the weight of nitrogen in the concentration while the latter accounts for the weights of both nitrogen and oxygen. As the SWRCB's GAMA program expresses the nitrogen MCL in terms of nitrate as nitrogen, and as this standard was adopted in the Kern River Watershed Coalition Authority's *Groundwater Quality Assessment Report*, the nitrate as nitrogen standard will also be applied in the Basin Setting. As such, nitrate as nitrate data must be divided by 4.43 to obtain the equivalent nitrate as nitrogen value.

The historical distribution of nitrate in wells show concentrations above the MCL and two times the MCL in the northwest near Buttonwillow Ridge and Lost Hills, southwest just south of Elk Hills, north of Bakersfield along the Friant-Kern Canal to the northern boundary of the KCS and west of the Friant-Kern Canal, and in the southeast to the east of SR 184, and in the south near the US 99 and Interstate 5 split.

In general, water quality observed in shallow groundwater is likely to result from a combination of natural and anthropogenic sources and processes, so that wells screened at shallower depths will likely be associated with higher constituent concentrations. However, as noted previously, construction information is available for a limited number of wells, so, at this time, no attempt has been made to correlate water quality with well depth, screened intervals or other information which might enable water quality to be associated with groundwater depths for specific aquifers.

6.8.3 Arsenic

Arsenic is a naturally occurring element commonly found in alluvial sediments in California and in Kern County. Its presence in groundwater is a result of the dissolution of the element in sediments containing arsenic minerals often derived from volcanic sources. Naturally occurring arsenic is detected at elevated concentrations throughout the subbasin. Arsenic occurs in groundwater throughout the subbasin, but most notably in the north-central, western, and southern portions of the subbasin.

6.8.4 Boron

Boron is a naturally occurring element commonly found in alluvial sediments in California and in Kern County. Boron is concentrated by the water solubility of its more common naturally occurring compounds, the borate minerals. Boron occurs in groundwater throughout the subbasin, but most notably in the western and eastern portions of the subbasin.

6.9 INTERCONNECTED SURFACE WATER SYSTEMS

Interconnected surface water systems are surface waters that are hydraulically connected by a continuous saturated zone to an underlying aquifer (DWR, 2016). Within the KCS, there are no interconnected natural surface water systems in monitored areas associated with the pumping zone of the regional aquifer system.

The following are naturally occurring surface water bodies within the KCS:

- Kern River: Flows within the KCS are a function of hydrologic conditions in the Kern River watershed and regulation by Isabella Dam and Reservoir; and
- Poso Creek and other minor streams: Streamflow is unregulated and is ephemeral within the KCS, principally occurring during “wet” months of “wet” years.

Other surface water bodies, such as the Buena Vista Aquatic Recreation Area (BVARA) lakes, are situated in former basins of natural surface water bodies but are now dependent on managed water deliveries, principally from the Kern River.

Since the advent of groundwater pumping in the KCS and subsequent impoundment and regulation of flow of the Kern River, groundwater levels near the river are no longer connected with the river bed by a continuous saturated zone. Groundwater depths and ground surface elevations near the Kern River, as well as stream gaging data, are presented herein to compare elevations of the Kern River bed with nearby groundwater elevations. The observation that there are now no interconnected surface water systems in the KCS is reflected in the aquifer characterization found in locally developed groundwater models. For example, groundwater levels in the Kern Delta Water District (KDWD) Superposition Model are indicated to be disconnected from the Kern River and other simulated streams (Todd, 2017).

6.10 GROUNDWATER ELEVATION AND THE KERN RIVER

Recent maps of groundwater contours developed by the Kern County Water Agency support the view that there is a significant separation between the potentiometric surface near the river channel and the elevation of the river bed in areas where groundwater elevations have been mapped near the Kern River. For example, data from a wet year (2011) and a dry year (2015) for monitored areas of the KCS (KCWA, 2012 and KCWA, 2016), indicate depths to groundwater greater than 100 feet below ground surface

(bgs). In 1998, after three consecutive "wet" water years, depths to groundwater were very close to the river bed within the ID4 monitoring area (as close as 10 to 40 feet bgs) (KCWA, 1999), likely due to multiple wet years with Kern River recharging groundwater as illustrated below, as well as imported surface water attributable to local water banking operations.

The Hydrologic Profile from the most recent *Kern Fan Operations Report* (KCWA, 2018), illustrates prevailing groundwater conditions both spatially and temporally near the Kern River. This profile, which is transverse to the axis of the Kern River, indicates that during "wet" years, such as 1998 and 2006, groundwater elevations are highest directly below the Kern River bed while, during "dry" years, groundwater levels have declined to depths greater than 200 feet below the river bed. This prevailing pattern suggests that, during wet years, recharge to groundwater from the Kern River channel and nearby water banking operations forms a groundwater mound that gradually flows away from the river to the north and the south. Conversely, in dry years, there is an overall decrease in groundwater levels due to the lack of recharge from the Kern River and nearby water banking operations.

Upstream of the ID4 monitoring coverage is a segment of the river, near Hart Park and the First Point of Measurement within KCS, that has available groundwater elevation data from KCWA for supply wells 29S/28E-02A01 and 29S/28E-10K01. These wells are located upgradient of Rocky Point Weir, and groundwater elevation data are plotted against the elevation of the adjacent river bed. In general, water levels in the wells consistently ranged from approximately 27 to 49 feet lower than the river bed between 1995 to 2016. In 2017, the water level in 29S/28E-02A01 appeared to rise; however, the rise was not consistent with the last 20 years of data; subsequent measurements could confirm the water level in 29S/28E-02A01.

Stream gaging data for the Kern River are available for stations upstream of the KCS at Democrat Springs (USGS 11192500 and USGS 11192000), as well as at the First Point of Measurement upstream of Beardsley River Weir and Rocky Point Weir. Differences in annual flow volumes were calculated between Democrat Springs and the First Point of Measurement (factoring in diversions between these points) for water years 1990 through 2016. In general, streamflow tends to increase between Democrat Springs and the First Point of Measurement during wet years (i.e. 1993, 1995, 1998, 2005, and 2011), which in part reflects surface water inflow from tributaries along this segment of the River. In contrast, Kern River flows decrease during some dry years such as 2001, 2008, 2009, and 2013, but also exhibit gains during the periods from 2001 to 2002 and from 2013 to 2014.

Data plotted as monthly changes in flow reflect increasing flows in the Kern River between Democrat Springs and First Point of Measurement during wet months, as well as during many dry months. These data suggest that, if gaging station data are accurate, then it is likely that the Kern River gains flow from groundwater. There are, however, data gaps in determining the extent of Kern River flow gains in

the Kern River canyon compared with the River segment upstream of the First Point of Measurement and within the KCS.

Although available data confirm that the Kern River is not interconnected with the underlying groundwater downstream of the First Point of Measurement, it appears that the Kern River from Democrat Springs to the First Point of Measurement may be gaining flow, with accretion from groundwater being one of the sources contributing to these gains. However, available data between these two locations (approximate 22 1/2-mile reach) are not adequate to refine the assessment of gaining and losing segments from the east boundary of the KCS to the First Point of Measurement (approximate 10-mile reach). In this regard, there are several mapped springs throughout the Kern River Canyon, with an absence of any mapped springs below the mouth of the canyon within the KCS, indicating that the majority of gains are likely within the canyon. Further investigation with stream gaging may be warranted from the east boundary of the KCS to the First Point of Measurement.

The USGS stream gage on the North Fork Kern River has recorded an average annual mean discharge of 806 cubic feet per second (cu ft/s) and a maximum daily discharge of 33,600 cu ft/s, and the USGS stream gage on the South Fork Kern River shows an average annual mean discharge of 123 cu ft/s and a maximum daily discharge of 14,000 cu ft/s. In contrast the first stream gage below Isabella Dam has recorded an average annual mean of 946 cu ft/s but a maximum daily discharge of only 7,030 cu ft/s. Due to water withdrawals the three stream gage stations below Isabella Dam show a dramatically decreasing discharge. At the USGS stream last gage in the Kern River canyon, near Bakersfield, the river's average flow is only 312 cu ft/s which corresponds to 9,839,232,000 cu ft/yr or an average of 225,878 afy.

Stream gaging for Poso Creek is available at the monitoring point located beneath the State Highway 65 bridge. During the past 20 years the peak surface flow for Poso Creek, was 65,000 afy. The minimum surface flow during the past 20 years was 966 afy and the average surface flow is 15,000 afy (Cawelo, 2014). Drainage from the Poso Watershed accumulates into Poso Creek and Poso Creek discharges onto the valley floor. During most years Poso Creek flows during only the wetter late winter and early spring months. Only during the wettest of years do surface flows extend within Poso Creek into the central portion of the valley floor.

6.11 GROUNDWATER DEPENDENT ECOSYSTEMS

Groundwater Dependent Ecosystems (GDEs) are ecological communities that depend on groundwater emerging from aquifers or groundwater occurring near the ground surface. In the Kern Subbasin, potential GDEs are likely to be associated with wetlands and riparian areas that are supported either by shallow groundwater or by a combination of shallow groundwater and surface water. As discussed previously, shallow groundwater is present in west-central and southern portions of the KCS.

Ephemeral wetlands covered by water seasonally are likely to be supported by irrigation deliveries and precipitation and are unlikely to be surface expressions of groundwater. Features such as groundwater recharge basins that are artificially flooded with surface water, although having the potential to provide habitat, also depend on diversion of surface water rather than groundwater.

The distribution of GDEs in the Kern Subbasin was assessed based on research presented in the paper, *Mapping Groundwater Dependent Ecosystems in California* (Plos 1, 2010, 0012249). This research was published by scientists at The Nature Conservancy of California (TNC) (Howard and Merrifield, 2010) and used geospatial data to map hydrologic features characteristic of potential GDEs. The methodology applied in this research mapped the following variables as surrogates to represent ecosystem dependence on groundwater:

- Density of springs and seeps
- Density of groundwater dependent wetlands and associated vegetation alliances
- Percent of discharge from groundwater (baseflow) in streams

There is a dense population of springs and seeps in the mountains and foothills on the flanks above the KCS. However, in the valley floor area covered by the Hydrogeologic Conceptual Model, springs or seeps are not identified except in areas adjacent to the Kern River. Thus, the contribution of springs and seeps to GDEs in the KCS is restricted to lands immediately adjacent to the Kern River.

There is a dense population of groundwater dependent wetlands in the mountains and foothills in the eastern and western flanks above the KCS but much of the valley floor south of Tulare Lake is mapped as having no groundwater dependent wetlands or has having a very low density of these wetlands. Areas mapped as having a low or medium density of potential groundwater dependent wetlands lie in the Kern River Fan and other areas where water banking activities fed by surface water diversions may have been mapped as groundwater dependent wetlands.

Groundwater potentiometric surfaces from Kern Fan Monitoring Reports (KCWA, 2016) indicate that underlying aquifers are not connected with these stream channels. Some flow in the Kern River, as well as in Poso Creek and other mountain-front creeks, is likely to be sustained periodically by release of bank storage (surface water stored in stream banks), but the underlying groundwater is too deep to sustain flow in the valley floor.

A high level of groundwater dependence occurs in the mountains and foothills on the east side of the subbasin. However, with the exception of riparian lands adjacent to the Kern River, mapped as having a medium ranking, all lands on the valley floor are mapped as having either no groundwater dependence or very low groundwater dependence.

In the west-central and southern KCS, shallow groundwater levels are adequate to support salt-tolerant vegetation due to a water table perched by a confining clay layer. Because of concerns regarding encroachment of perched groundwater into crop root zones coupled with the poor quality of the perched water, several programs have been put in place to manage this shallow groundwater. The shallow groundwater is not well suited to agricultural or domestic water supply. Therefore, existing water management practices and practices that may be introduced through the implementation of SGMA are unlikely to draw on the perched groundwater that supports GDEs.

6.12 DETAILED ANALYSIS UNIT 260

Within the groundwater basin the Central Valley Water Board has defined Detailed Analysis Units (DAU) to which existing beneficial groundwater uses generally apply. Due to the size of the DAUs, however, the listed uses may not exist throughout the DAU. The subject site located within DAU 260. Th principal aquifers are the recent alluvium and the underlying Kern River Formation. These sediments are coarse grained and contain high quality groundwater within the Kern River Fan. The beneficial groundwater uses currently identified in DAU 260 are municipal, agricultural, and industrial.

7. DISCUSSION OF MODELLING PARAMETERS

The Central Valley Water Board document entitled "*Nitrate Loading Assessments – Central Valley Jurisdictional Local Agency Management Programs*" (LAMPS), dated November 19, 2019, includes three checklists for LAMP's to use in evaluation the modelling using either the Hantzsche and Finnemore (1992) equations, which only consider the effect of vertically recharging wastewater on the water table or assessments using the Washington State Department of Ecology (WDOC, 2017) mass balance approaches, that require analysis in detail of local hydrogeology. The Central Valley Water Board parameter checklist requires a detailed discussion of the following modelling input parameters:

a. Provide a reference supporting the value for soil denitrification (d), Background Nitrate Nb, Infiltration Rate (I), Wastewater Loading Rate (W), Wastewater Total Nitrogen (Nw), Average Rainfall Recharge (R), and Resultant Nitrate (Nr) for the proposed project;

b. Provide literature references for use of 1 to 5 mg/L for background nitrate-nitrogen concentration, or provide calculations using a value of 5 mg/L; and

c. Provide calculations for the criteria requirements and provide excel sheet with calculations in resubmittal.

Denitrification (d) is the microbial process of reducing nitrate and nitrite to gaseous forms of nitrogen, principally nitrous oxide (N_2O) and nitrogen (N_2). A large range of microorganisms can denitrify. Denitrification is a response to changes in the oxygen (O_2) concentration of their immediate environment.

Only when O_2 is limited will denitrifiers switch from aerobic respiration to anaerobic respiration, using nitrite (NO_2) as electron acceptor. Denitrification is a process ubiquitous to all our terrestrial and aquatic ecosystems and occurs in tropical and temperate soils, in natural and intensively managed ecosystems, in marine and freshwater environments, in wastewater treatment plants, manure stores, and aquifers. It is now well accepted that denitrification can occur wherever available carbon, nitrate, and low oxygen concentrations co-occur in aggregates (Sexstone, 1985a), soil organic matter particles (Parkin, 1987), and in bulk soil following precipitation events. Field estimates of denitrification rates range from nil to >100 kg N $ha^{-1}year^{-1}$ (von Rheinbaben, 1990; Aulakh, 1992; Peoples., 1995), a range similar to that of leaching losses. In general, annual rates appear to be on the order of 20-50 kg N ha^{-1} $year^{-1}$. As a proportion of total N loss, the importance of denitrification relative to leaching losses appears to range from no leaching with moderate denitrification, denitrification and leaching about equal, to moderate leaching with no denitrification (Jones, 1977 and Winteringham, 1980). Part of the difficulty of measuring and therefore of understanding denitrification sufficiently well to accurately model the process at a field scale is related to denitrification's high spatial (Folorunso and Rolston, 1984 and Robertson., 1988) and temporal (Sexstone, 1985b and Parsons, 1991) variability in most ecosystems. Perhaps because of this variability, minimizing denitrification losses has not been a specific target of management techniques to date, where denitrification is known to represent a very high proportion of nitrogen loss. The WDOC mass balance modelling for scenario one in this report includes the default unitless d=0.01 in the study area, which is based upon the literature research of this government agency. Based upon the Central Valley Water Board parameter checklist, this report also includes the two additional worst case models using d=ND.

MRM' reviewed the USGS GAMA groundwater sampling results for Kern County of nitrate concentrations in the upper zone of groundwater and the underlying productive zone of groundwater (see Figure 19 - Nitrates in Groundwater and Attachment 2 for the CV Salts and USGS GAMA Nitrates in Groundwater Data). The USGS data demonstrates that the background concentration of nitrates (Nb) in the site area is very low, ranging from not detected to 1 mg-N/L. The WDOC mass balance modelling for scenario one in this report includes the actual background concentration of 1 mg-N/L in the study area and report also includes the two additional worst case 5 mg-N/L specified in the Central Valley Water Board parameter checklist.

The infiltration rate (I) is the velocity at which water seeps into the soil as expressed in ft/ft. The WDOC mass balance models presented in this report include an infiltration rate 0.001 ft/ft for the distal end of the coarse-grained Kern River Fan aquifer underlying the site.

The loading rate of an onsite system is the amount of wastewater applied to a square foot of soil per day. This rate depends on a number of factors, including the long-term acceptance rate of the soil at the infiltrative surface, the type of onsite system, and the contents of the wastewater. The wastewater

loading rate (W) in the WDOC mass balance equation is calculated in the model based upon the drainfield area (Ad), the wastewater volume (Vw), and the total nitrogen concentration in the wastewater (Nw). The Ad is the project area of 1,150,420 square feet (26.41 acres). The Vw is based upon Kern County's OSM assumed discharge of 5,000 gpd (50% of the septic tank volume) of wastewater for the 260 DFUs. The Nw of 70 mg/L is also specified in the OSM. *MRM* considers this Nw to be a worst case scenario because other LAMPs within the Central Valley Water Board Jurisdiction Area use Nw's ranging from 30-50 mg/L including the Central Valley Water Board in their guidance document.

The Average Rainfall Recharge (R) is the current 30-year average for the project location based on the National Weather Service (NWS) records of precipitation that are present on the Kern County Geographic Information System (GIS) website mapping (see Figure 6). For the arid conditions at the project site only 1% of the 6 inches of rainwater is assumed to be available to dilute the wastewater discharge. The WDOC mass balance modelling presented in this report includes an R of 0.06 inches/year.

The WDOC mass balance model uses the Richards equation representing the movement of water in unsaturated soils and was formulated by Lorenzo A. Richards in 1931 to calculate the resultant steady state nitrate concentration (Nr) in the groundwater aquifer (Nr). It is a nonlinear partial differential equation, which is often difficult to approximate since it does not have a closed-form analytical solution. Darcy's law was developed for saturated flow in porous media; to this Richardson applied a continuity requirement obtained a general partial differential equation describing water movement in unsaturated non-swelling soils. The transient state form of this flow equation, known as Richard's equation, writes in 1-D:

$$\frac{\partial \theta}{\partial t} = \frac{\partial}{\partial z}\left[K(\theta)\left(\frac{\partial h}{\partial z} + 1\right)\right]$$

Where:

K is the hydraulic conductivity,
h is the matric head induced by capillary action,
z is the elevation above a vertical datum,
Θ is the volumetric water content, and
t is time.

The equation used for the steady state nitrogen concentration at the property boundary is:

$$N_B = (((V_I+Q)*N_{GW})+(V_{RD}*N_R*(1-d)))/(V_I+V_{RD}+Q)$$

Where:

N_B is the nitrogen concentration at the property boundary,
V_I is the volume of infiltration from the drainfield area,
Q is the aquifer discharge,
N_{GW} is the downgradient nitrogen concentration,
V_{RD} is the volume of discharge downgradient,
N_R is the nitrogen concentration in precipitation, and
d is the soil denitrification,

Given:

V_I = VR+VW, which is the total volume of the recharge and wastewater
Q = K*i*b*WA*7.48052, which is the hydraulic conductivity * hydraulic gradient * aquifer thickness * aquifer width * 7.48062 gallons/cubic feet,
N_{GW} = ((Q*NBG)+(VI*NI))/(Q+VI), which is the ((aquifer discharge * background nitrogen concentration)+(volume of infiltration from drainfield * nitrogen concentration from drainfield))/(aquifer discharge + volume of discharge from drainfield). and
V_{RD} = ARD*R*0.00170788, which is the area between drainfield and property boundary * recharge volume * 0.00170788 unit conversion factor,

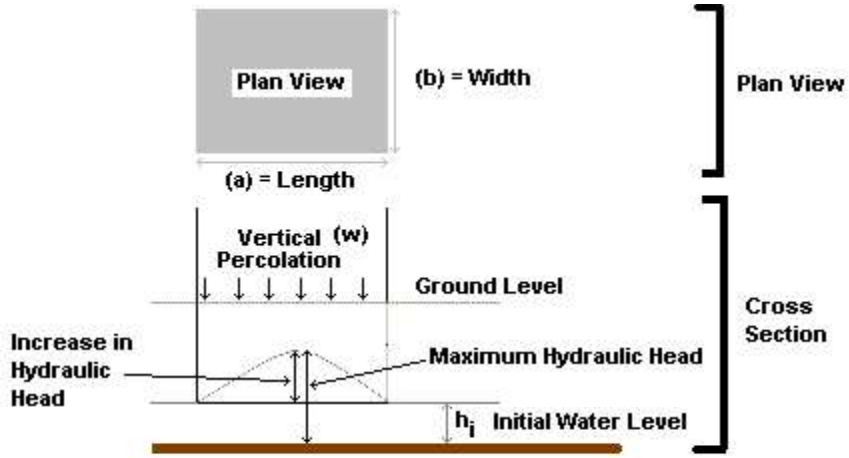
8. GROUNDWATER MOUNDING STUDY

In accordance with the OSM, the groundwater mounding shall not result in more than a 50-percent reduction in the required minimum depth to seasonally high groundwater, and at no time shall groundwater rise to within 2 feet of trench bottom. The average annual rainfall at the site is approximately 6 inches, as is displayed on annual precipitation map from the KCDPW (see Figure 6). Most of the precipitation is received during the winter months from December through March. Isohyetal maps obtained from the KCDPW Floodplain Management Department indicate that the 100-year, 24-hour, maximum precipitation is 2 inches. Evaporation is in excess of 80 inches per year, and the thickness of the moisture-deficient zone is in excess of 50 feet (see Attachment 1). The KCWA publishes annual maps showing the depth to water, and groundwater quality for groundwater basins within Kern County. The depth to the regional unconfined aquifer is currently estimated to be in excess of 150 fbg at the site, and the groundwater gradient is anticipated to be to the northwest, toward the axis of the San Joaquin Valley (see Figures 15 and 16). Historical depth to water based on a review of available DWR online maps (DWR Water Data Library) indicates a historical high depth to water of 100 fbg between the years 1970 to 2010. The groundwater table has steadily declined over the past decades and will not likely recovered to this historic groundwater level. Therefore, for the purpose of this study an average depth to groundwater of 150 fbg was used in the models. It is important to note that neither model is sensitive to the depth of groundwater since all wastewater is assumed to migrate to the groundwater table and the steady state

impacts of the rise in groundwater table and increase in nitrate concentrations are the observed output. Because of the significant percentage of sands in the vadose zone, the hydraulic conductivity is high at an average of 3 to 25 feet/day (f/d) for the approximately 150 feet of unsaturated sediments beneath the site. and the specific yield is approximately 20%.

The proposed projects consists of seven commercial buildings including a travel center, a convenience store, four fast food restaurants, and a lube shop with an estimated 260 DFUs yielding 5,000 gpd, which is 50% of the septic tank capacity, resulting in an annual volume of water discharge through the DFUs of 1,825,000 gallons (5.60 afy).

If the entire volume of water is discharged to the subsurface and migrates downward to the groundwater, then a maximum of 1,825,000 gallons per year (5.60 afy) could reach the groundwater table at a depth in excess of 150 fbg, discounting any reduction in discharge volume resulting from evapotranspiration processes. The groundwater mounding model is based upon Hantush, M.S.(1967). *Growth and Decay of Groundwater-Mounds in Response to Uniform Percolation*, Water Resources Research vol. 3, no.1, pp 227-234 as represented below:



The Hantush (1967) equation representing the groundwater mounding beneath a rectangular recharge area is given by:

$$h_m^2 - h_i^2 = (2w/K)vtS^*((0.5L/(\sqrt{4vt})),(0.5W/(\sqrt{4vt})))$$

where:

$$v = K\bar{b}/\varepsilon$$

$$\bar{b} = 0.5(h_i(0) + h(t))$$

where h_m is the maximum height of the mound

h_i is the initial height of the water table

w is the recharge or percolation rate

K is the hydraulic conductivity

t is the time of interest

L is the length of the rectangular recharge area

W is the width of the rectangular recharge area

ε is the specific yield of the aquifer.

S* is an integral equation given by:

$$S^*(\alpha,\beta) = \int_0^1 erf(\frac{\alpha}{\sqrt{\tau}}) \bullet erf(\frac{\beta}{\sqrt{\tau}}) d\tau$$

Based upon the sandy sedimentary sequence with a hydraulic conductivity at an average of 3 to 25 f/d for the approximately 150 feet of unsaturated sediments beneath the site. the specific yield is approximately 20%, and the discharge of 5.600 gallons in a day results in a calculated maximum mounding of approximately 1.8 feet, which is not a 50 percent reduction in the required minimum depth to seasonally high groundwater and at no time shall groundwater rise to within 2 feet of trench bottom (see Table 1 - Groundwater Mounding Spreadsheet). Therefore, the proposed OWTS at the site complies with the conditions for maximum groundwater mounding specified in the OSM.

9. NITRATE LOADING STUDY

The nitrate loading calculations are based upon the OSM daily discharge value for 260 DFUs of wastewater of 5,000 gallons, which is 50% of the septic tank capacity, with a concentration of 70 mg/L, unless the project proponent can demonstrate that site specific conditions or treatment will result in a reduced volume of the wastewater or concentration of nitrate in the wastewater. For developments served by existing water systems, the OSM specifies that the total loading of nitrate shall not result in an average groundwater nitrate-nitrogen concentration that exceeds 10 mg of nitrate as nitrogen per liter (mg-N/L) over the geographical extent of the project site. The nitrate infiltration model includes a site specific determination of the depth to groundwater, the physical characteristics such as permeability and nitrate adsorption of the vadose zone from the depth of the discharge from the OWTS through the depth of groundwater, the background nitrate as nitrogen concentration of the receiving water, the estimate of the volume of discharge and the concentration of nitrates in the discharge, and the resulting calculation of the nitrate loading in the groundwater underlying the site. The fate of this nitrate discharge to the subsurface is dependent upon numerous factors including the depth to groundwater, physical characteristics of the underlying sediments including the permeability and denitrification within the vadose zone, the background concentration of nitrate in the receiving water, and the flow of groundwater in the saturated zone.

Nitrate is highly soluble and is a negatively charged ion, and since soil particles are also negatively charged there is very little adsorption and nitrate is transported through the soil horizon by the infiltrating waste water and rain water. Once in groundwater, nitrates continue to move unimpeded, generally migrating concurrently in the direction and velocity of the groundwater itself. This nitrate loading study includes a discussion of the wastewater infiltration downward through the unsaturated vadose zone as well as mass balance model for the nitrates once they migrate to the depth of groundwater.

To be conservative, *MRM* has included a steady state model which assumes that all of the wastewater, with a concentration of 70 mg/L, will eventually migrate to the groundwater aquifer, *MRM* has used a mass balance model, developed by the Washington Department of Ecology, which assumes through conservation of mass, that the mass of nitrate entering the groundwater system equals the mass of nitrate leaving the groundwater system. Although there may be many other factors, the underlying assumption in the approach is that the nitrates entering the system are primarily reduced by mixing. A more comprehensive mass balance model would consider all sources of nitrates and water entering and exiting the groundwater system, such as infiltrating rainwater, septic system, background groundwater, fertilizer, animal waste, soil, stormwater runoff, groundwater flow, water well withdrawal, and denitrification. To simplify the mass balance approach the following assumptions were made regarding these complex interactions.

1) All nitrogen leaving the septic system is completely converted to nitrates and eventually reaches the groundwater.

2) Dilution primarily accounts for the reduction in nitrate concentration. The model does not consider dispersion, diffusion or adsorption, and denitrification is assumed to be minimal with an input value of 0.01.

3) Rainwater infiltrating across the site provides groundwater recharge to dilute nitrates from the septic systems. For the arid conditions at the site only 1% of the rainwater is assumed to be available to dilute the wastewater discharge. The 6 inches per year of precipitation results in a recharge rate of 0.06 inches per year.

4) There is uniform and complete mixing of the septic system wastewater with the infiltrating rainwater and upgradient groundwater.

5) While complete mixing between wastewater and recharge water occurs within a shallow depth of the water table with dilution occurring within the upper 100 feet of the aquifer, the fresh water bearing alluvium at the site exceeds 2,000 feet in thickness, which permits additional dilution to occur until steady state conditions are obtained. A conservative value of 1,000 feet in thickness is used for this model. The actual background concentration of nitrates in the groundwater aquifer is assumed to be 1 mg/L.

6) Groundwater investigations and groundwater monitoring at nearby sites in the area indicate that the aquifer is comprised of porous and permeable silty to coarse-grained sands in the Quaternary alluvium and Kern River Formation. Therefore, the depth to groundwater, hydraulic conductivity, and hydraulic gradient in the aquifer are assumed to be 240 fbg, 10 ft/day, and 0.001 ft/ft.

The first model is based upon the actual hydrogeologic conditions at the site. Given the parameters modelled for the 26.41 acre (1,150,420 square feet) property that has a width of 1,136 feet perpendicular to the groundwater flow direction, a length of 1,066 feet parallel to the groundwater flow direction, the OSM daily discharge value for 260 DFUs of wastewater of 5,000 gallons, which is 50% of the septic tank capacity, with a nitrate concentration of 70 mg/L into in excess of 1,000-foot thick aquifer, the 6 inches per year of precipitation resulting in a recharge rate of 0.06 inches per year, a hydraulic gradient of 0.001 ft/ft for the distal end of the coarse-grained Kern River Fan aquifer underlying the site, and the literature denitrification of 0.01, the resulting steady state nitrate concentration for the proposed project is 4.79 (mg-N/L at the property boundary using an initial actual background concentration of 1 mg-N/L, which satisfies the OSM's limit of 10 mg-N/L over the geographical extent of the property boundaries

(see Table 1). Therefore, the proposed OWTS at the site complies with the conditions for maximum nitrate loading specified in the OSM when modeled using the actual hydrogeologic conditions.

The second scenario modelled is a worse case analysis based upon parameters provided by the Central Valley Water Board. Given the parameters modelled for the 26.41 acre (1,150,420 square feet) property that has a width of 1,136 feet perpendicular to the groundwater flow direction, a length of 1,066 feet parallel to the groundwater flow direction, the annual precipitation per year resulting in a recharge rate of 0.06 inches per year, a hydraulic gradient of 0.01 ft/ft for the coarse-grained Kern River Fan aquifer underlying the site, using the Kern County OSM value for 260 DFUs of 5,000 gpd for the daily discharge into the in excess of 1,000-foot thick aquifer and wastewater nitrate concentration of 70 mg/L, the Central Value Water Board worst case denitrification of not detected (ND), and worse case background nitrate concentration of 5 mg/L, the resulting steady state nitrate concentration is 8.82 mg-N/L at the study area boundary, which satisfies the OSM's limit of 10 mg-N/L over the geographical extent (see Table 2). Therefore, the proposed OWTS at the site complies with the conditions for maximum nitrate loading specified in the OSM using the Central Valley Control Board's worse case parameters.

The third scenario modelled is the cumulative impact of adding this OWTS to the existing OWTS within the square mile that the proposed OWTS is to be located. The site is located within a mile square unincorporated area within the rural area of Kern County that is not served by municipal sewage, The only other wastewater discharge in the area is a similar commercial center located at the SEC of Stockdale Highway and Interstate 5. Theis second commercial center is assumed to have a similar daily discharge of 5,000 gpd. Given the parameters modelled for the 640 acres that has width of 5,280 feet perpendicular to the groundwater flow direction, a length of 5,280 feet parallel to the groundwater flow direction, a daily wastewater discharge of 10,000 gpd into the in excess of 1,000-foot thick aquifer, the annual precipitation per year resulting in a recharge rate of 0.06 inches per year the annual precipitation per year resulting in a recharge rate of 0.06 inches per year, and a hydraulic gradient of 0.001 ft/ft for the coarse-grained Kern River Fan aquifer underlying the site, the literature denitrification of 0.01, and actual background nitrate concentration of 1 mg/L, the resulting cumulative steady state nitrate concentration is 2.67 mg-N/L within the square mile that the proposed OWTS is to be located within the square mile that the proposed OWTS is to be located, which satisfies the OSM's limit of 10 mg-N/L over the geographical extent (see Table 3). Therefore, the proposed OWTS at the site complies with the conditions for maximum nitrate loading specified in the OSM. within the square mile that the proposed OWTS is to be located within the square mile that the proposed OWTS is to be located.

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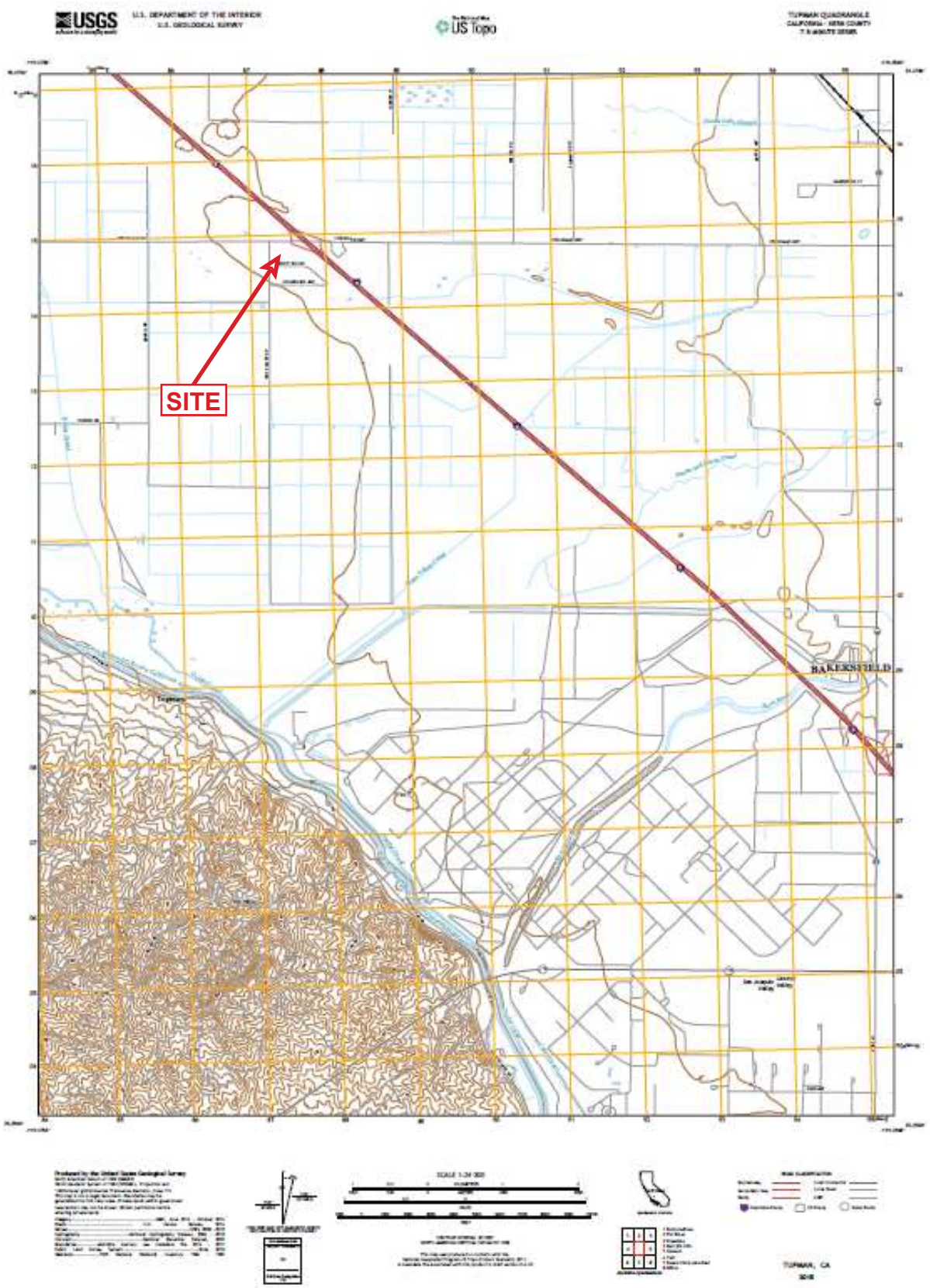
SECTION II.

FIGURES



LEGEND

LAV-PINNACLE ENGINEERING

COMMERCIAL SITE - PD PLAN MAP 121
SWC STOCKDALE HIGHWAY AND INTERSTATE 5
BAKERSFIELD, CALIFORNIA

FIGURE 1 - SITE LOCATION MAP

Mark R. Magargee, PG, CHg

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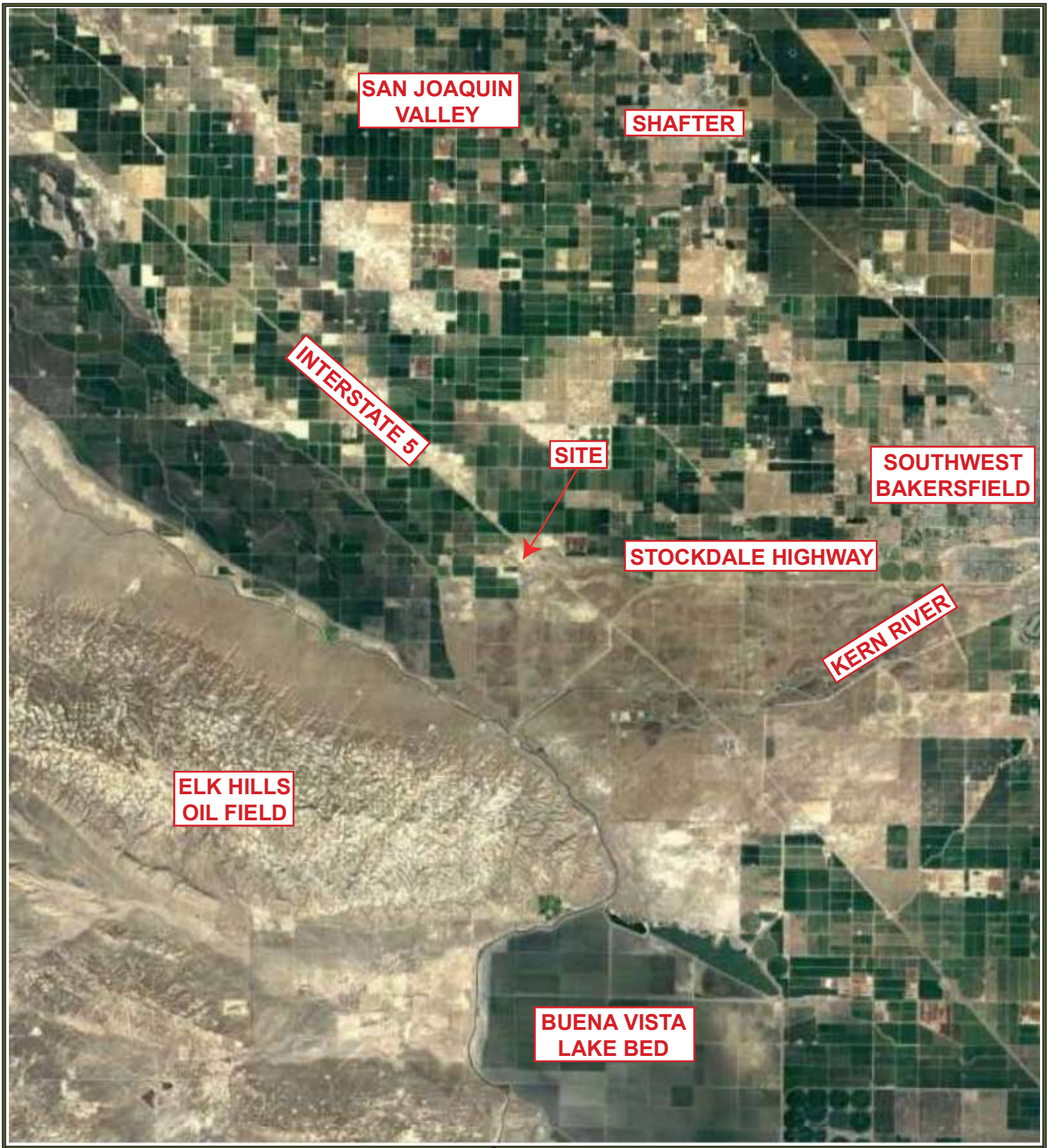

LEGEND	LAV-PINNACLE ENGINEERING
	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 2 - SITE VICINITY AERIAL**
	Mark R. Magargee, PG, CHg

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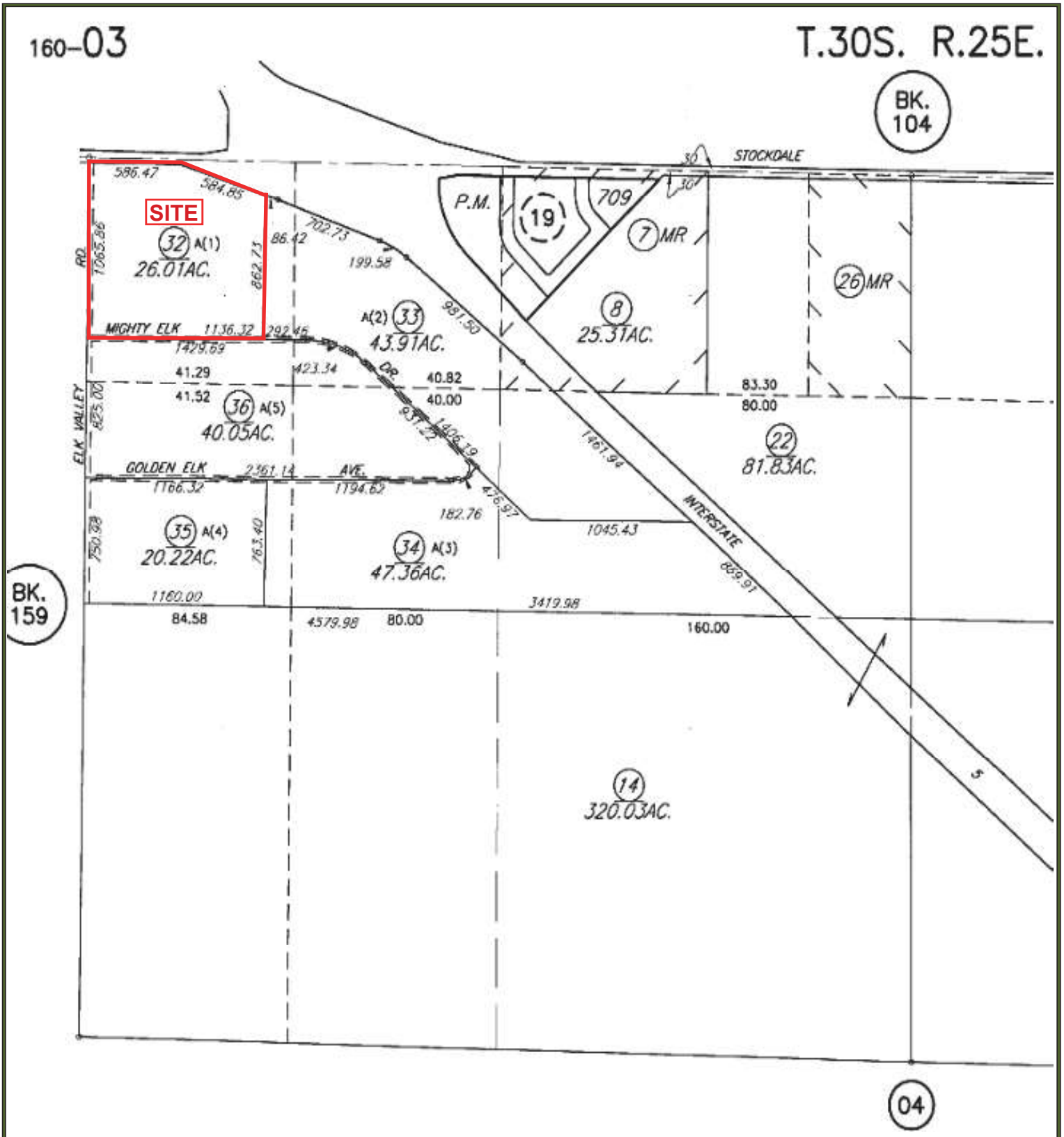

LEGEND	LAV-PINNACLE ENGINEERING
ASSESSOR'S PARCEL NUMBER: 160-030-32	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA
	FIGURE 3 - ASSESSOR'S PARCEL MAP
	Mark R. Magargee, PG, CHg

REVISED: SEPTEMBER 22, 2023: mrm



LEGEND	LAV-PINNACLE ENGINEERING
	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 4 - PLOT PLAN**
	Mark R. Magargee, PG, CHg

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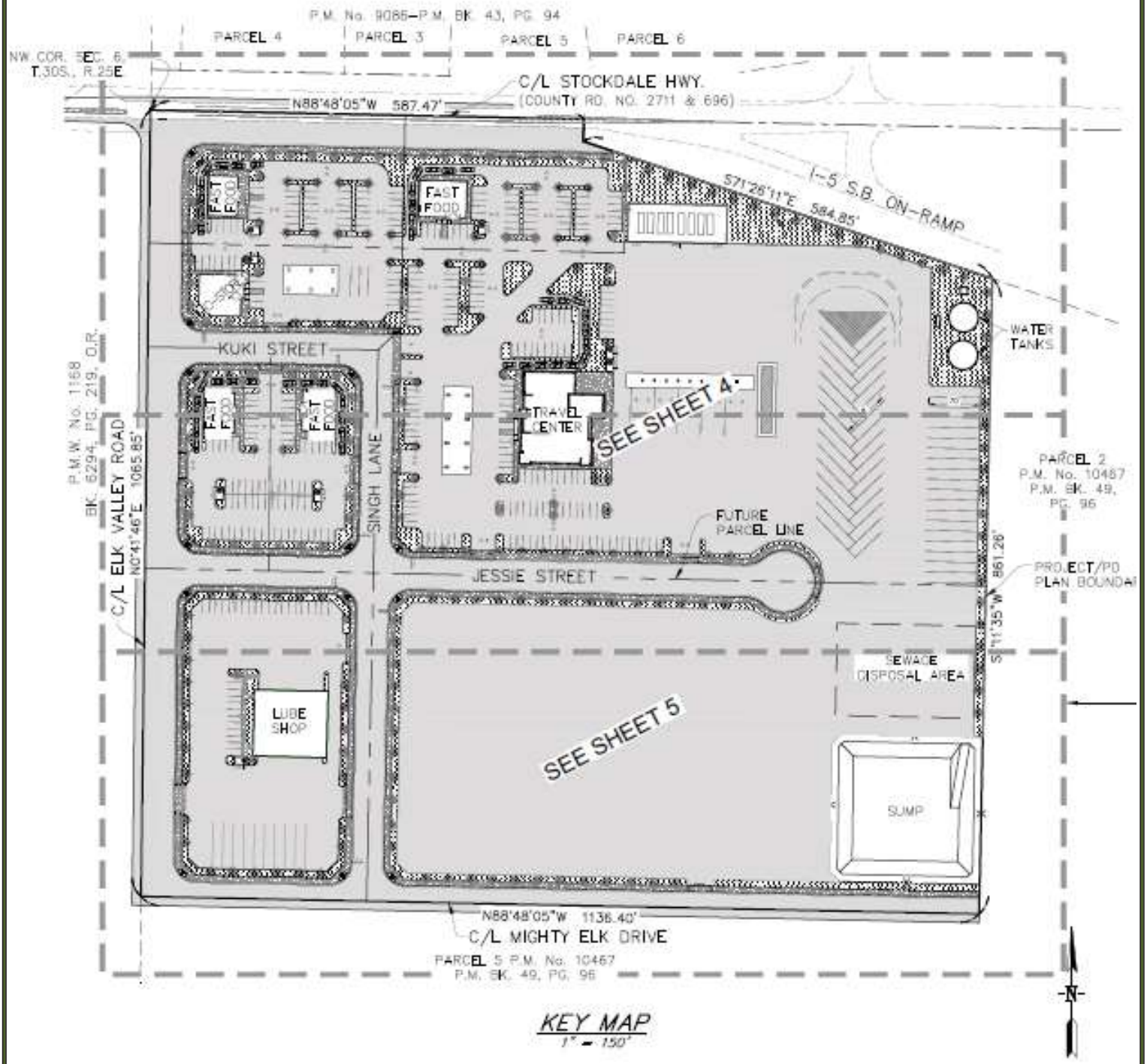

LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 5- FACILITY DIAGRAM** *Mark R. Magargee, PG, CHg*

REVISED: SEPTEMBER 22, 2023: mrm



LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 6 - ZONING MAP**
	Mark R. Magargee, PG, CHg

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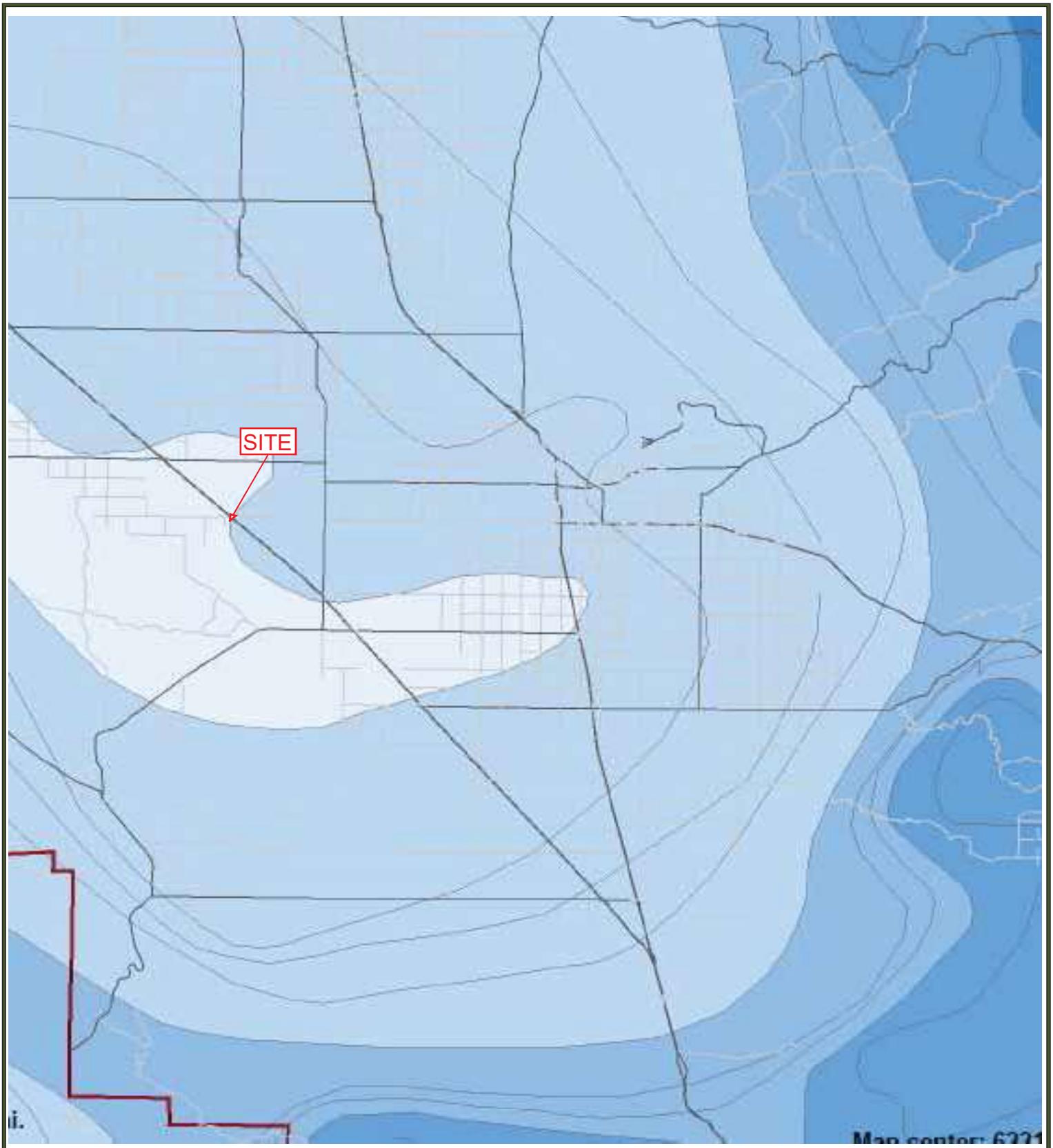

LEGEND	LAV-PINNACLE ENGINEERING
	COMMERCIAL SITE - PD PLAN 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA
	FIGURE 7 - ANNUAL PRECIPITATION MAP
	Mark R. Magargee, PG, CHg

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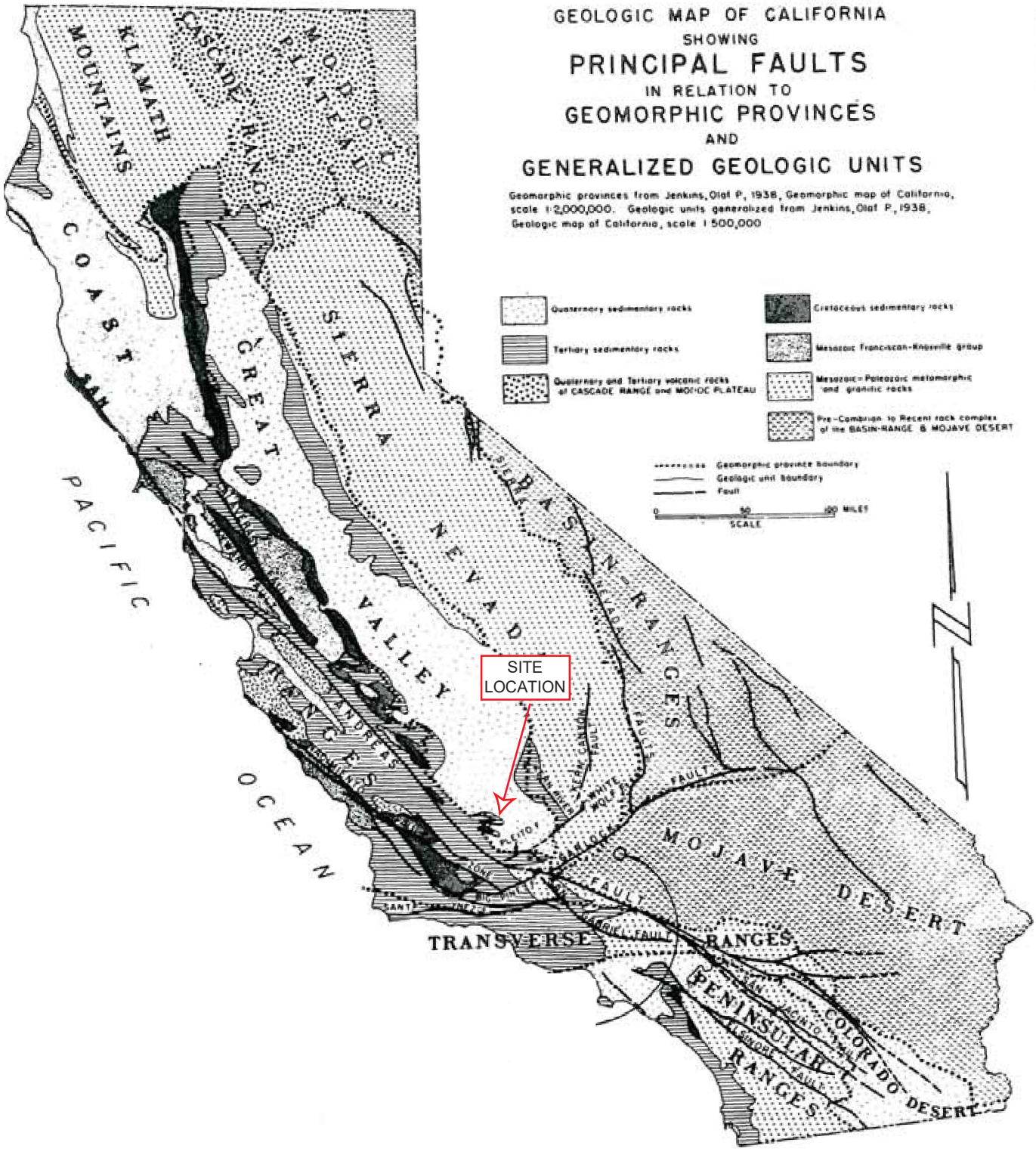
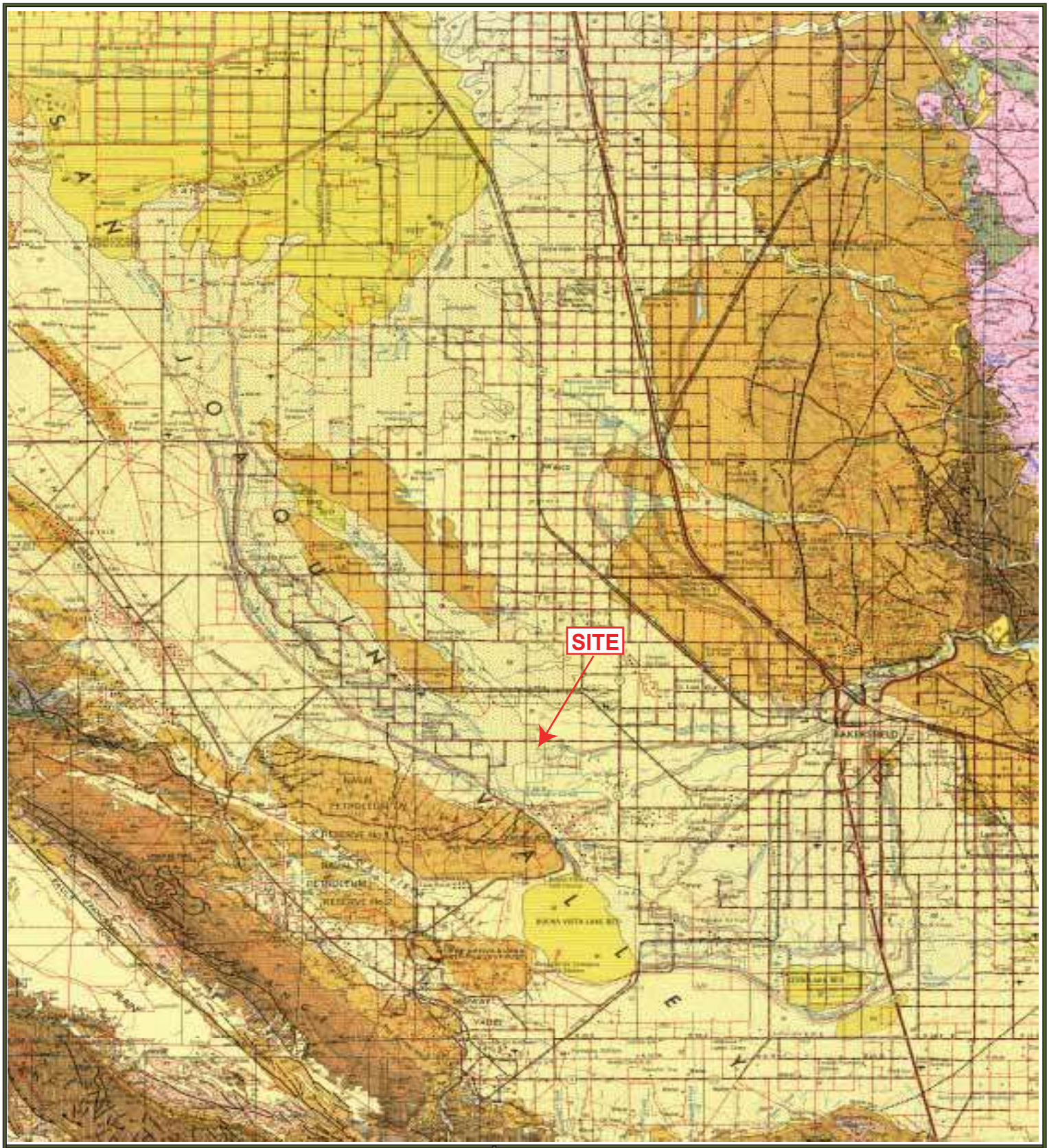
GEOMORPHIC PROVINCE MAP OF CALIFORNIA



LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA FIGURE 8 - GEMOMORPHIC PROVINCE MAP OF CALIFORNIA
	Mark R. Magargee, PG, CHg

REVISED: SEPTEMBER 22, 2023: mrm



LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 9 - GEOLOGY MAP** *Mark R. Magargee, PG, CHg*

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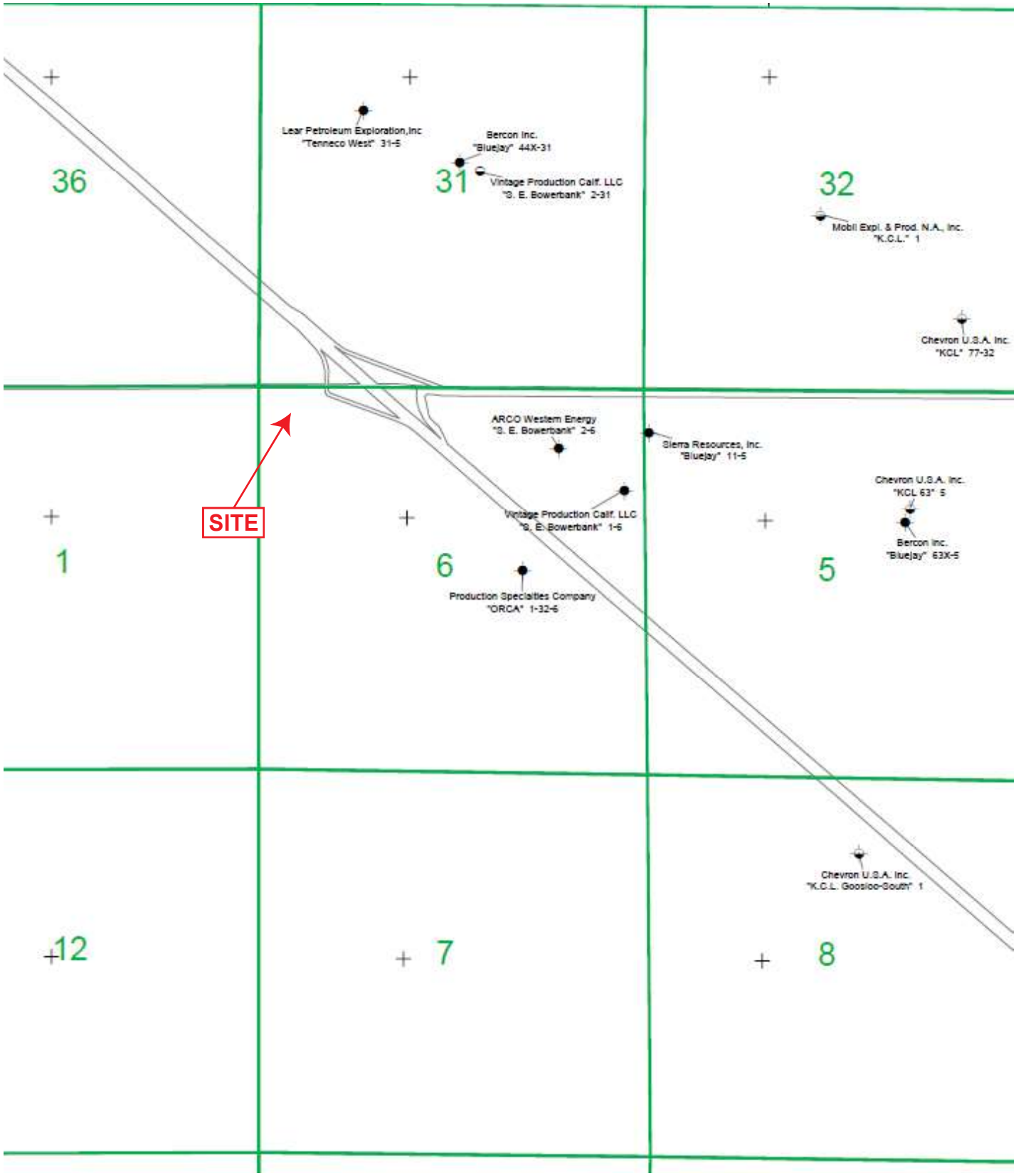

LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 10 - OIL FIELD MAP**
	Mark R. Magargee, PG, CHg

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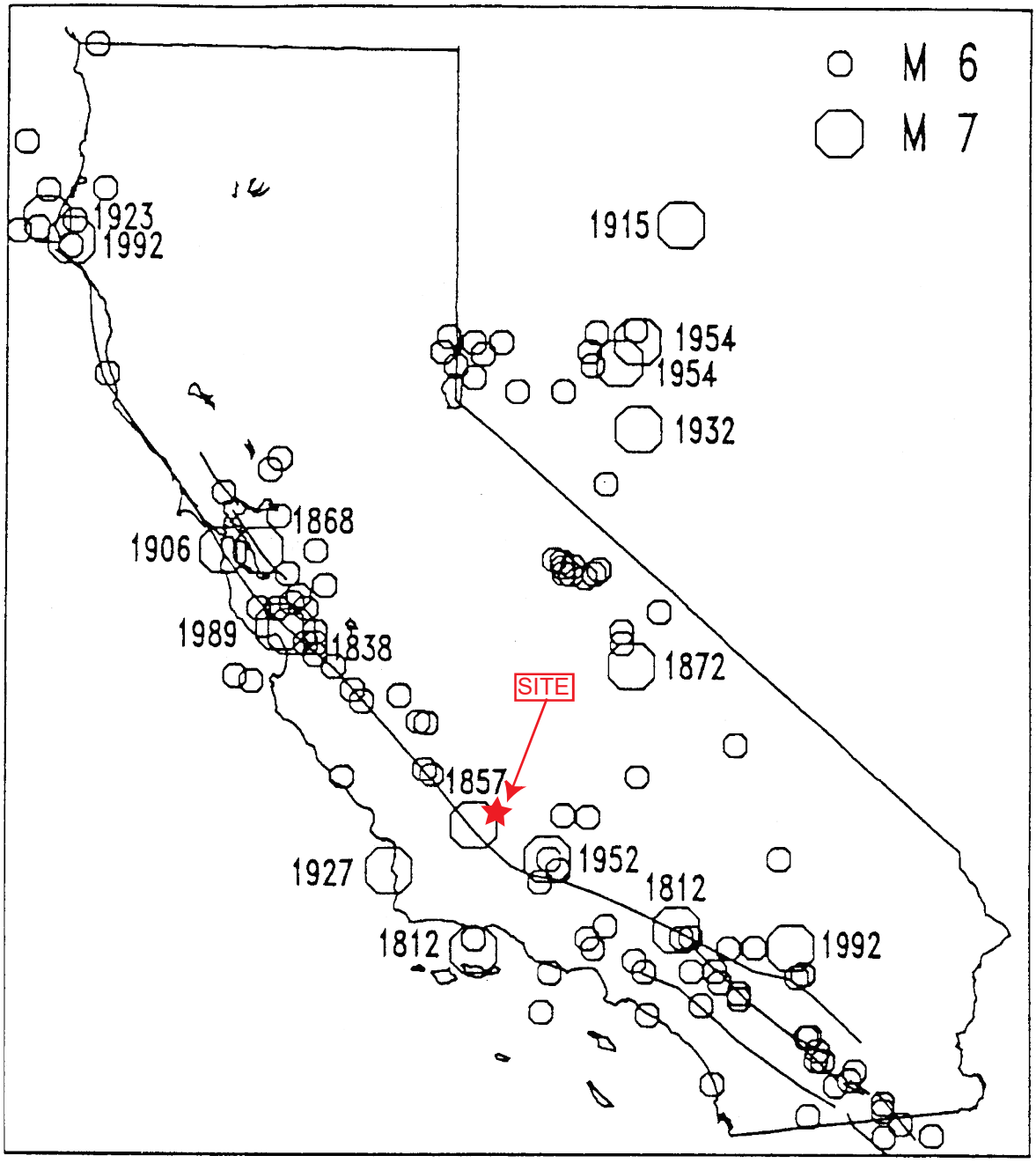
HISTORIC SEISMICITY IN CALIFORNIA



Seismicity M≥6 in California between about 1800 and 1994 (DMG catalog).

(from Peterson and others, 1996)

LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA FIGURE 11 - HISTORIC SEISMICITY MAP OF CALIFORNIA *Mark R. Magargee, PG, CHg*

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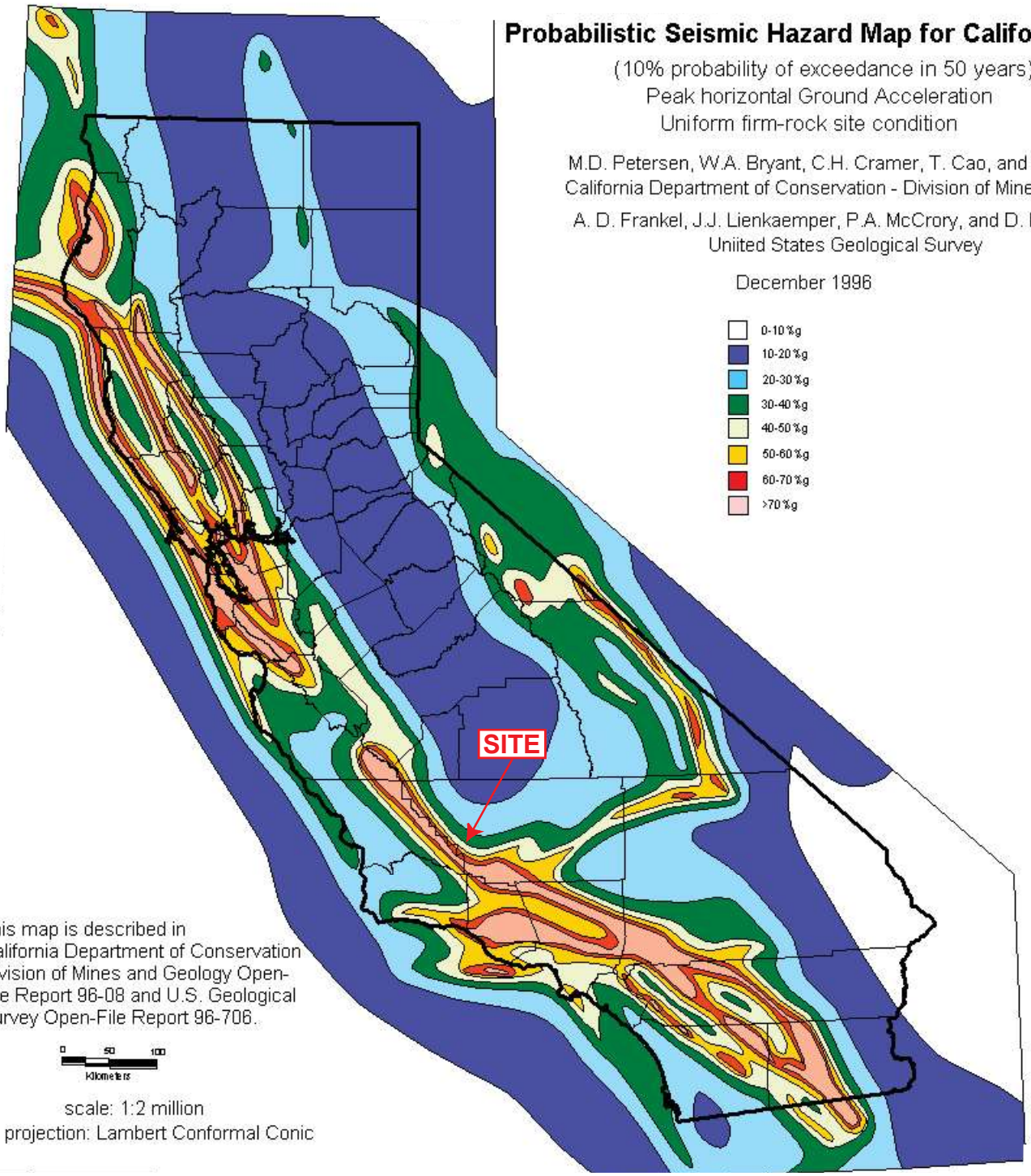

LEGEND	LAV-PINNACLE ENGINEERING
	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA FIGURE 12- PROBABILISTIC SEISMIC HAZARD MAP OF CALIFORNIA
	Mark R. Magargee, PG, CHg

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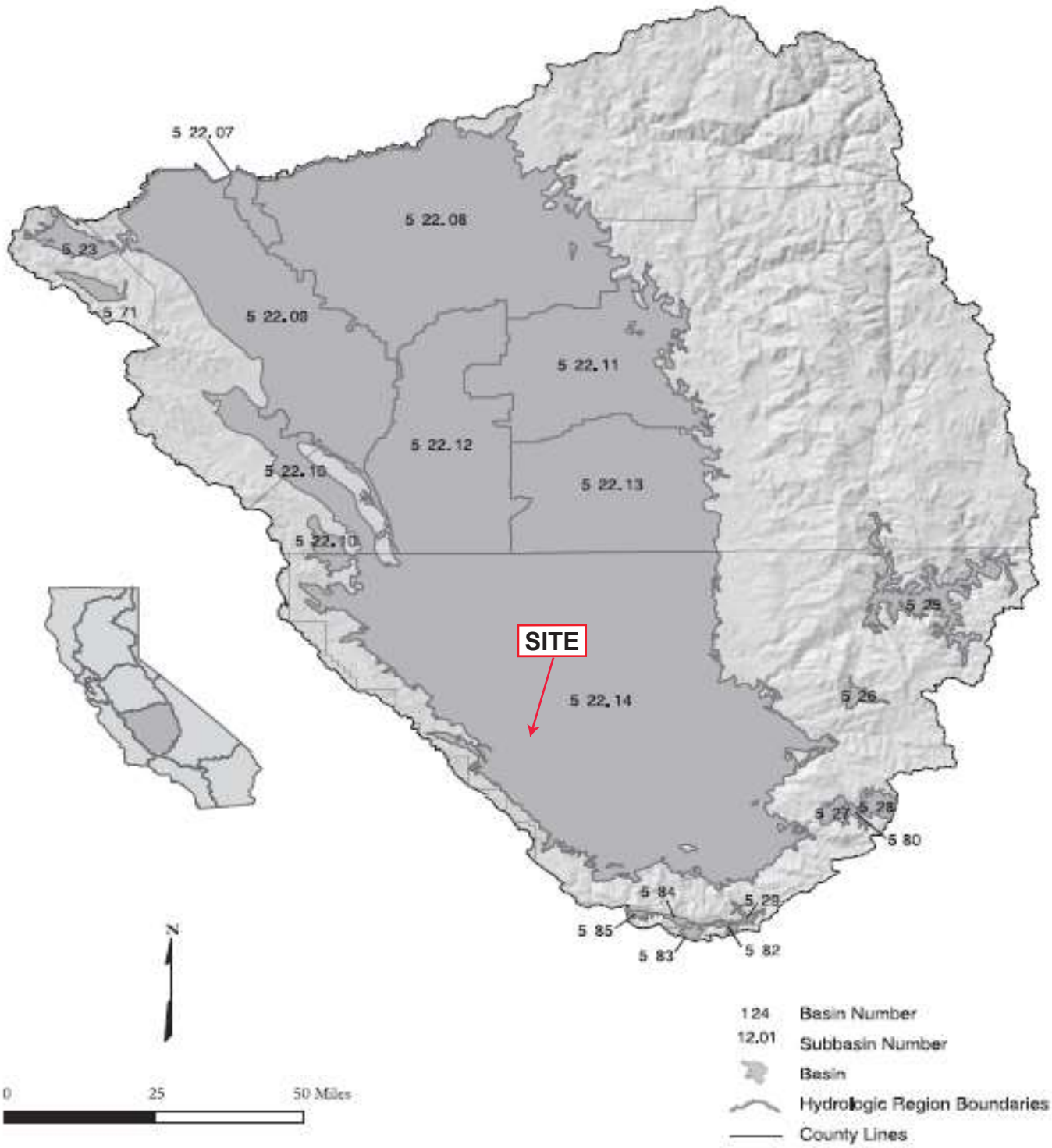

LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 13 - HYDROLOGIC BASIN MAP** *Mark R. Magargee, PG, CHg*

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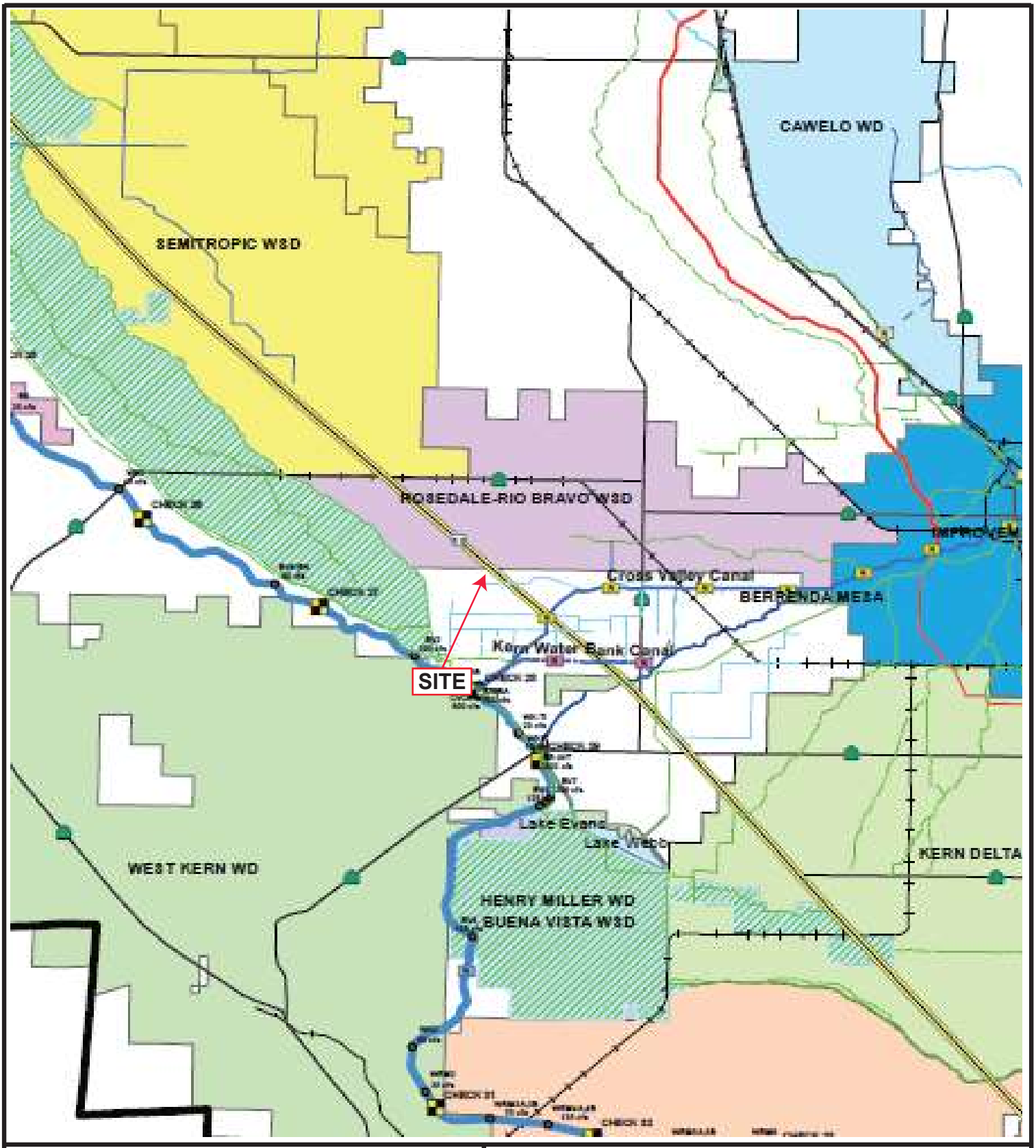

LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 14 - WATER DISTRICT BOUNDARY MAP** *Mark R. Magargee, PG, CHg*

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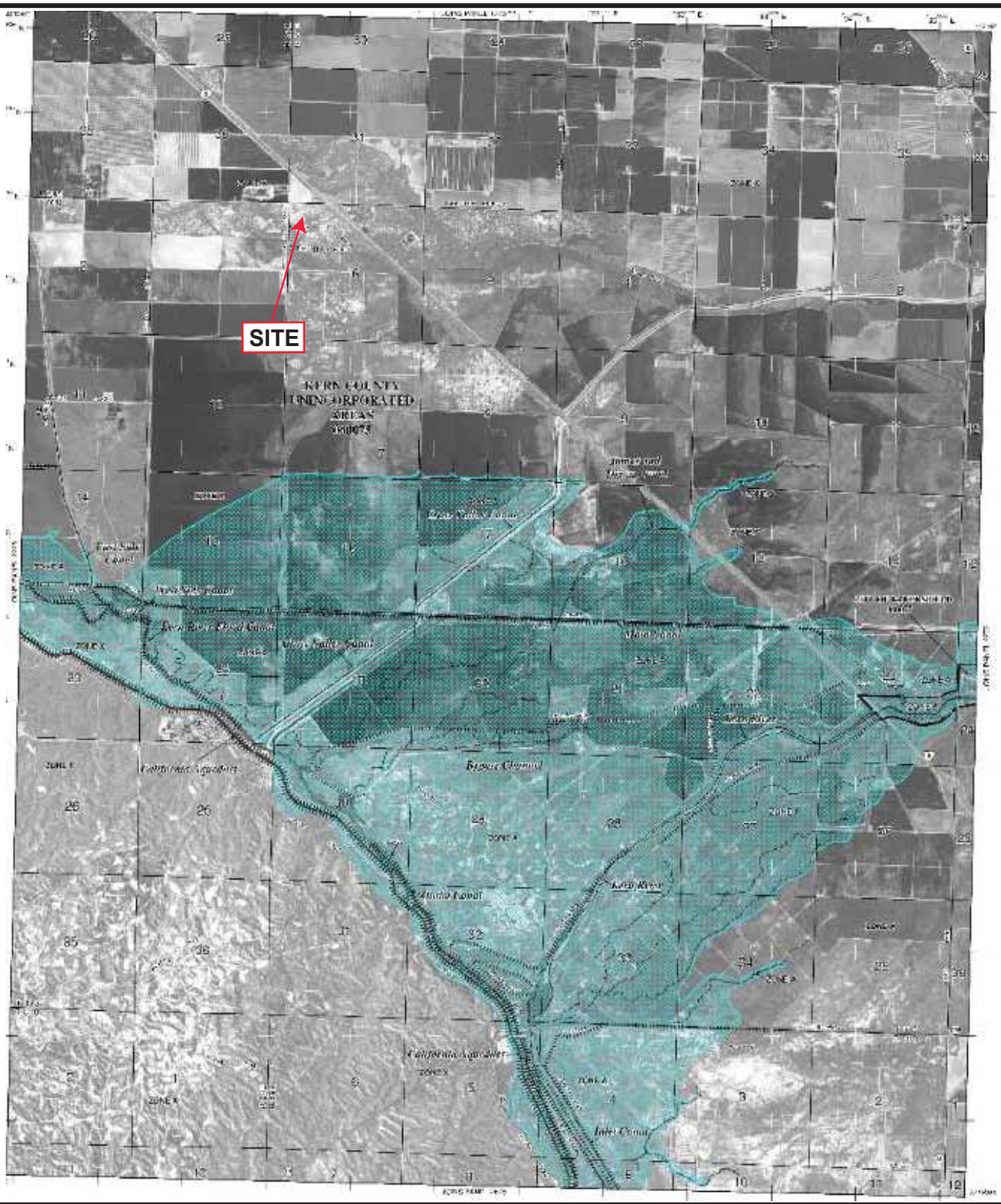

LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 15 - FLOOD ZONE MAP**
	Mark R. Magargee, PG, CHg

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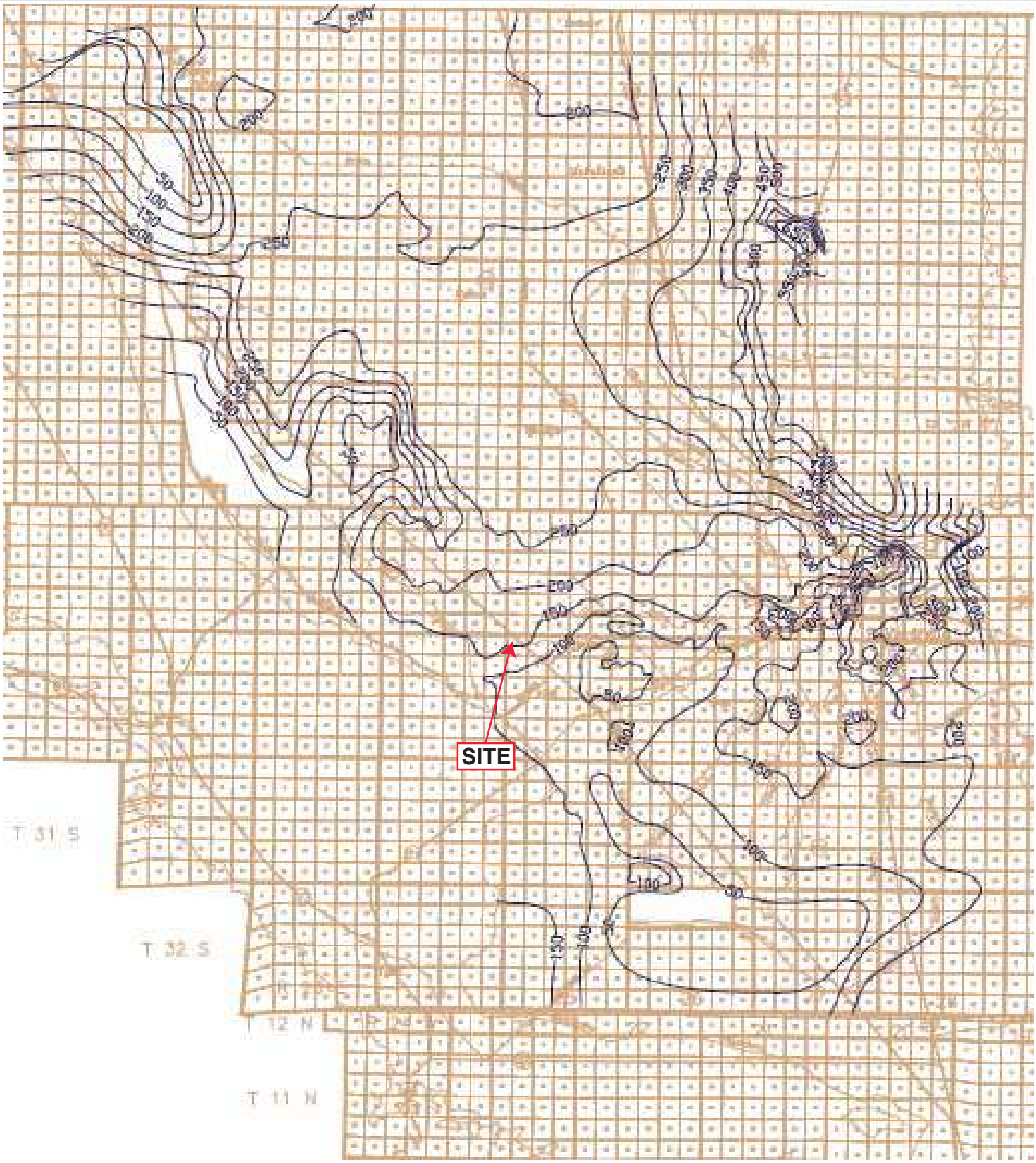

LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 16 - DEPTH TO GROUNDWATER MAP**
	Mark R. Magargee, PG, CHg

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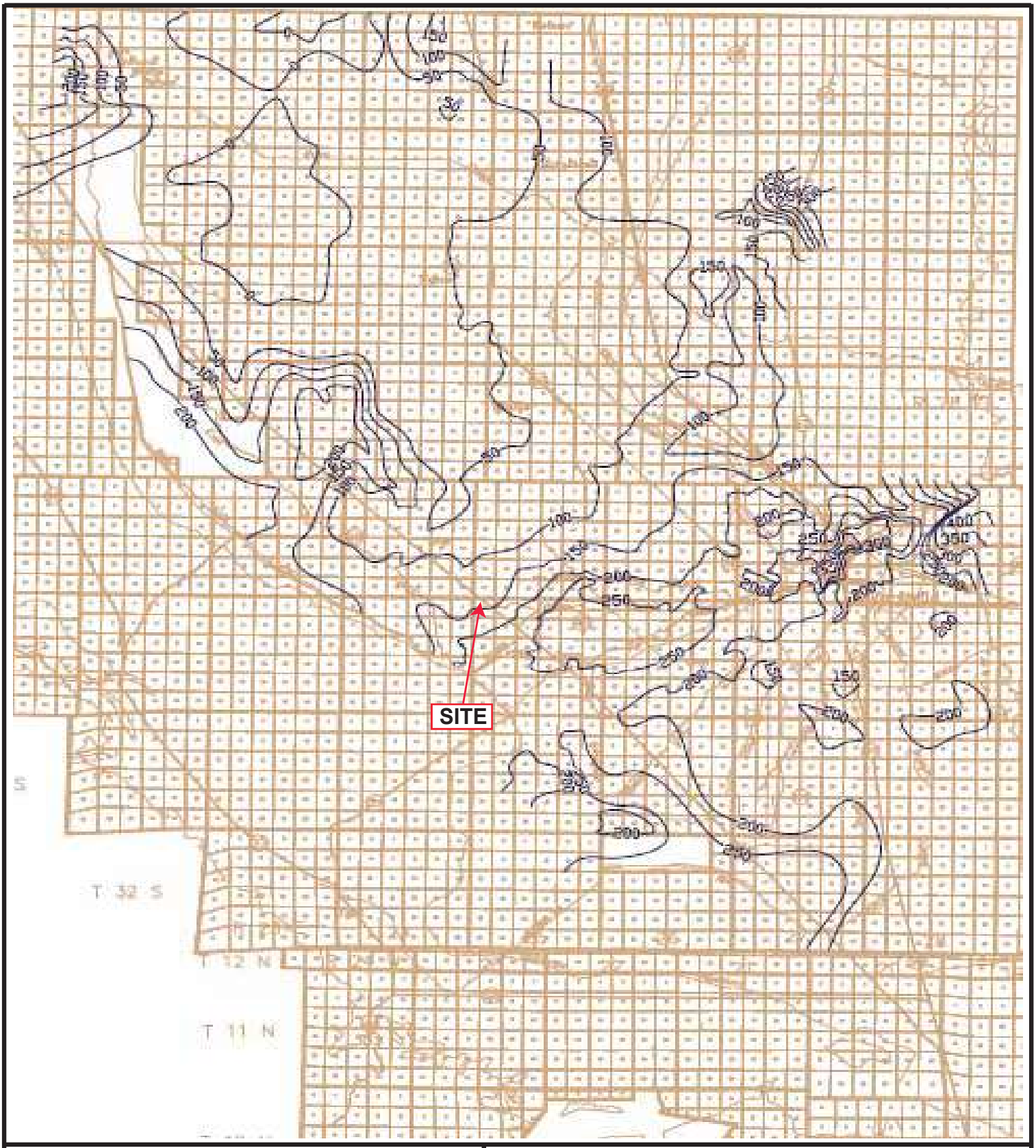

LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 17 - GROUNDWATER ELEVATION MAP** *Mark R. Magargee, PG, CHg*

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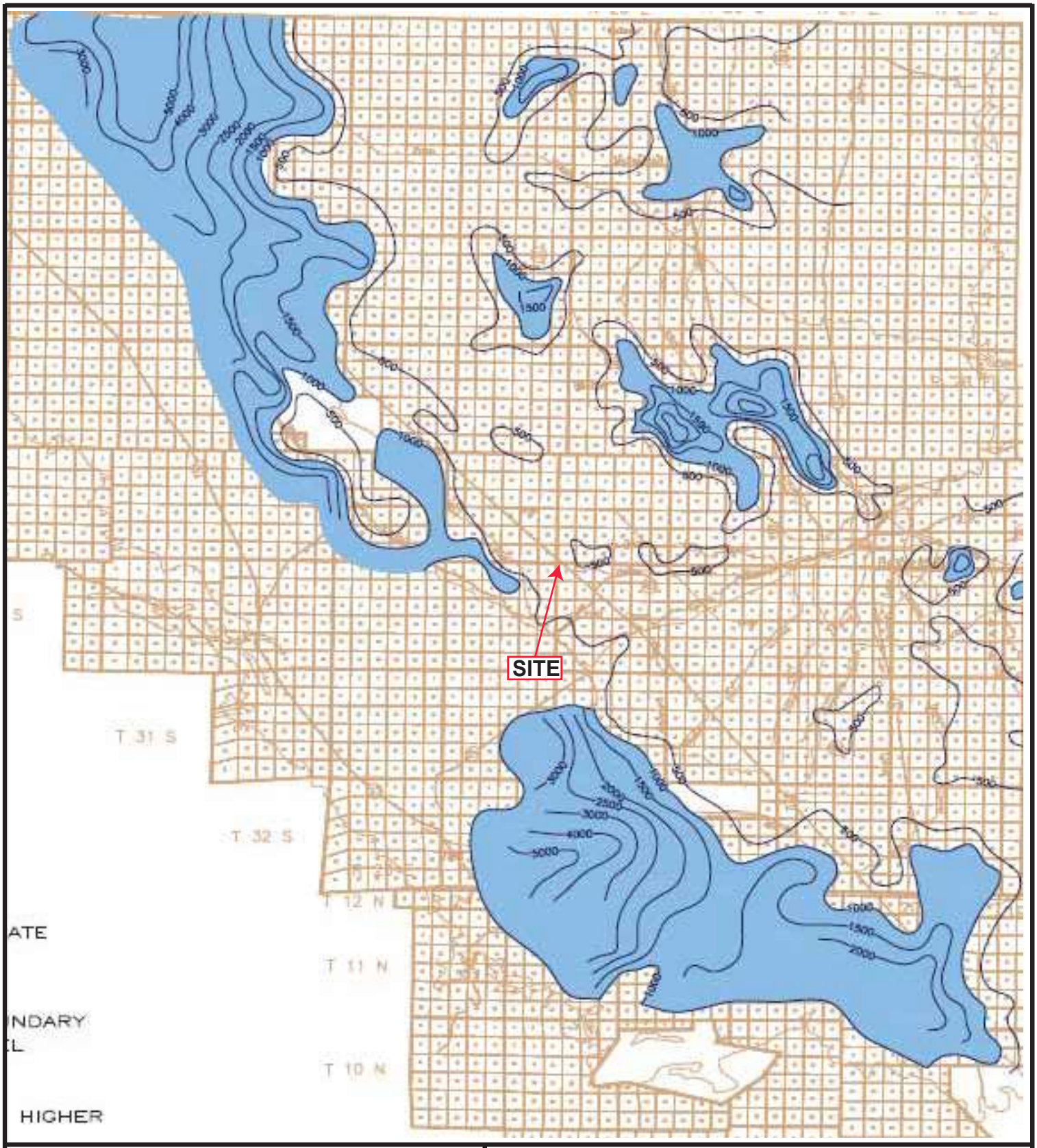

LEGEND	LAV-PINNACLE ENGINEERING
N	COMMERCIAL SITE - PD PLAN MAP 121 SWC STOCKDALE HIGHWAY AND INTERSTATE 5 BAKERSFIELD, CALIFORNIA **FIGURE 18 - GROUNDWATER QUALITY MAP**
	Mark R. Magargee, PG, CHg

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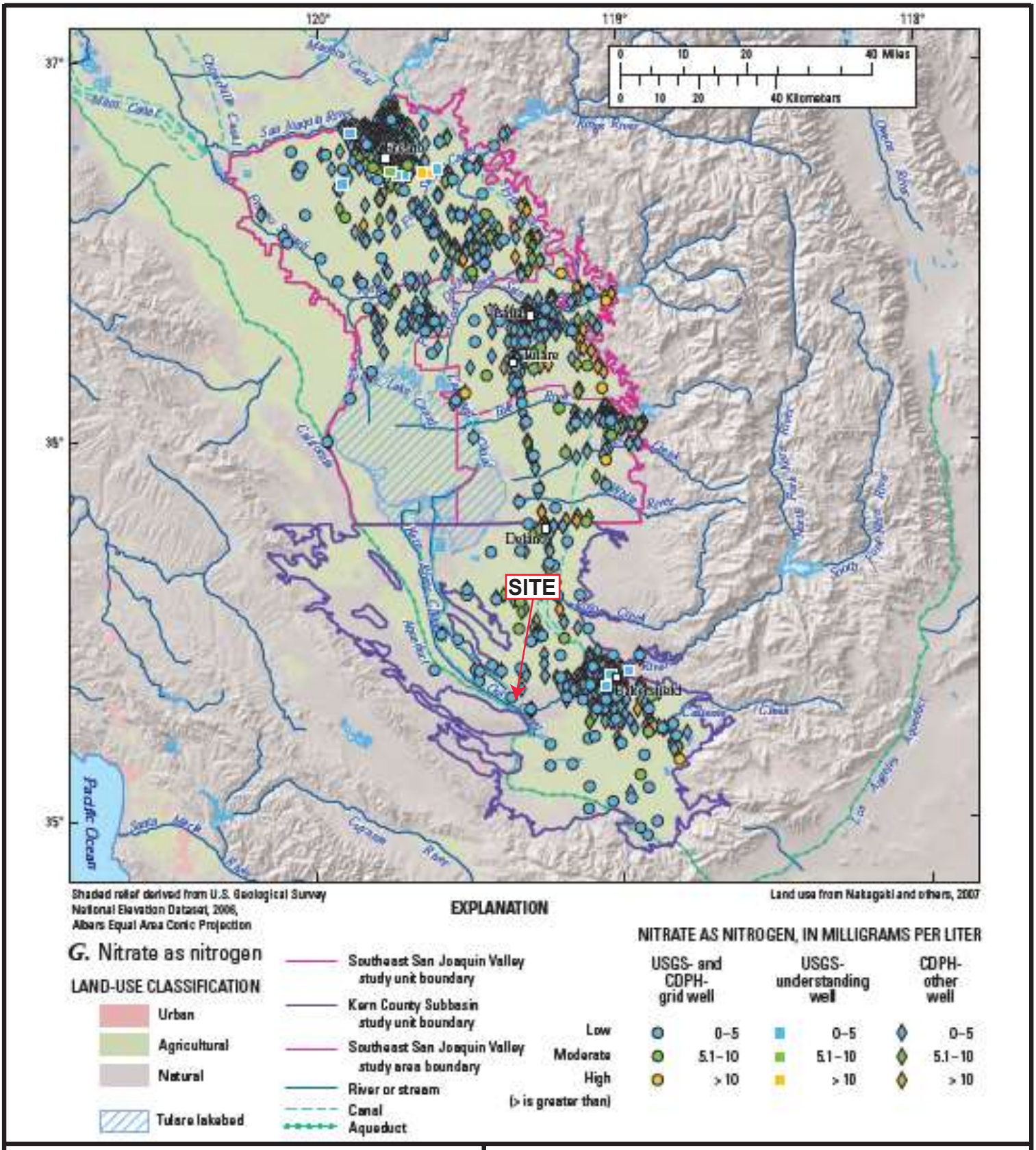


LEGEND

N

LAV-PINNACLE ENGINEERING

COMMERCIAL SITE - PD PLAN MAP 121
SWC STOCKDALE HIGHWAY AND INTERSTATE 5
BAKERSFIELD, CALIFORNIA

FIGURE 19 - NITRATES IN GROUNDWATER MAP

Mark R. Magargee, PG, CHg

REVISED: SEPTEMBER 22, 2023: mrm

SECTION III.

TABLES

TABLE 1. - GROUNDWATER MOUNDING SPREADSHEET

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

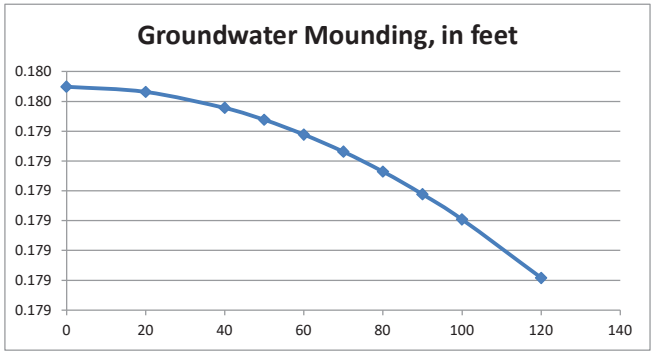
Input Values

0.0009	***R***	**Recharge (infiltration) rate (feet/day)**
0.800	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
10.00	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
1100.000	**x**	**1/2 length of basin (x direction, in feet)**
1100.000	**y**	**1/2 width of basin (y direction, in feet)**
3650.000	**t**	**duration of infiltration period (days)**
1000.000	**hi(0)**	**initial thickness of saturated zone (feet)**

1000.180	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
0.180	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
0.180	0
0.180	20
0.179	40
0.179	50
0.179	60
0.179	70
0.179	80
0.179	90
0.179	100
0.179	120

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

TABLE 2 ACTUAL NITRATE BALANCE SPREADSHEET

Project name:	**Commercial Site - PD Plan Map 121**
Address, city and county:	**SWC Stockdale Highway and Interstate 5, Bakersfield, California**
Completed by (name and title):	**Mark R. Magargee, PG, CHG**
Date:	**September 22, 2023**

Input Values	Factor	Units	Values	Instructions	Information Source
Nitrate concentration in precipitation	N_R	mg/l as N	0.24	Default	
Total nitrogen concentration in wastewater	N_W	mg/l	70	Kern County OSM value	
Soil denitrification	d	unitless	0.01	literature value	
Aquifer thickness	b	ft	1000	aquifer thickness	
Drainfield area	A_D	ft^2	1,150,446	Primary drainfield area	
Distance from drainfield to property boundary	D_{pb}	ft	1,066	Measure in direction of GW flow	
Aquifer width	W_A	ft	1,136	Perpendicular to GW flow	
Aquifer hydraulic conductivity	K	ft/day	10	Measured value	
Hydraulic gradient	i	ft/ft	0.001	Site hydrogeologic value	
Recharge	R	in/yr	0.06	Recharge is 1% of ppt	
Nitrate concentration of upgradient ground water	N_B	mg/l	1	Prefer sampling data	
Wastewater volume	V_W	gpd	5,000	Design flows or measured volume	
Output Values					
Groundwater nitrate value	N_{GW}	mg/l as N	4.79	Point of Compliance (POC)	
Groundwater nitrate value	$N_{GW\ ALT}$	mg/l as N	4.78	Alternative POC	

TABLE 3 WORSE CASE NITRATE BALANCE SPREADSHEET

Project name:	**Commercial Site - PD Plan Map 121**
Address, city and county:	**SWC Stockdale Highway and Interstate 5, Bakersfield, California**
Completed by (name and title):	**Mark R. Magargee, PG, CHG**
Date:	**September 22, 2023**

Input Values	Factor	Units	Values	Instructions	Information Source
Nitrate concentration in precipitation	N_R	mg/l as N	0.24	Default	
Total nitrogen concentration in wastewater	N_W	mg/l	70	Kern County OSM value	
Soil denitrification	d	unitless	0	Central Valley Water Board value	
Aquifer thickness	b	ft	1000	aquifer thickness	
Drainfield area	A_D	ft^2	1,150,446	Primary drainfield area	
Distance from drainfield to property boundary	D_{pb}	ft	1,136	Measure in direction of GW flow	
Aquifer width	W_A	ft	1,066	Perpendicular to GW flow	
Aquifer hydraulic conductivity	K	ft/day	10	Measured value	
Hydraulic gradient	i	ft/ft	0.001	Site hydrogeologic value	
Recharge	R	in/yr	0.06	Recharge 1% of ppt	
Nitrate concentration of upgradient ground water	N_B	mg/l	5	Central Valley Water Board value	
Wastewater volume	V_W	gpd	5,000	Kern County OSM value	
Output Values					
Groundwater nitrate value	N_{GW}	mg/l as N	8.82	Point of Compliance (POC)	
Groundwater nitrate value	$N_{GW\ ALT}$	mg/l as N	8.81	Alternative POC	

TABLE 4 CUMULATIVE NITRATE BALANCE SPREADSHEET

Project name:	**Commercial Center - PD Plan Map 121**
Address, city and county:	**SWC Stockdale Highway and Interstate 5, Bakersfield, California**
Completed by (name and title):	**Mark R. Magargee, PG, CHG**
Date:	**September 22, 2023**

Input Values	Factor	Units	Values	Instructions	Information Source
Nitrate concentration in precipitation	N_R	mg/l as N	0.24	Default	
Total nitrogen concentration in wastewater	N_W	mg/l	70	Kern County OSM value	
Soil denitrification	d	unitless	0.01	literature value	
Aquifer thickness	b	ft	1,000	aquifer thickness	
Drainfield area	A_D	ft^2	27,878,400	Primary drainfield area	
Distance from drainfield to property boundary	D_{pb}	ft	0	Measure in direction of GW flow	
Aquifer width	W_A	ft	5,280	Perpendicular to GW flow	
Aquifer hydraulic conductivity	K	ft/day	10	Measured value	
Hydraulic gradient	i	ft/ft	0.001	Site hydrogeologic value	
Recharge	R	in/yr	0.06	Recharge 1% of ppt	
Nitrate concentration of upgradient ground water	N_B	mg/l	1	measured value	
Wastewater volume	V_W	gpd	10,000	Design flows or measured volume	
Output Values					
Groundwater nitrate value	N_{GW}	mg/l as N	2.67	Point of Compliance (POC)	
Groundwater nitrate value	$N_{GW\ ALT}$	mg/l as N	2.67	Alternative POC	

SECTION IV.

ATTACHMENTS

ATTACHMENT 1.

KERN COUNTY PUBLIC HEALTH SERVICES DEPARTMENT LETTER, DATED NOVEMBER 2, 2020

KERN COUNTY
Public Health Services
DEPARTMENT

MATTHEW CONSTANTINE
DIRECTOR

2700 M STREET, SUITE 300 BAKERSFIELD, CALIFORNIA 93301-2370 VOICE: 661-862-8740 FAX: 661-862-8701 WWW.CO.KERN.CA.US/EH

INTEROFFICE MEMORANDUM

To: Cody Wilder
From: Evelyn Elizalde
Subject: TPM 12255

Date: November 2, 2020

The Kern County Public Health Services Department, Environmental Health Division (KCEH) has reviewed the above referenced project. This Division has the local regulatory authority to enforce state regulations and local codes as they relate to waste discharge, water supply requirements, and other items that may affect the health and safety of the public or that may be detrimental to the environment.

Prior to project approval, KCEH requests the following:

1) A Cumulative Impact Assessment shall be prepared by a licensed professional. The applicant shall refer to the LAMP for requirements on Groundwater Mounding and Nitrate Loading Analysis and qualified professional requirements. This study shall address groundwater mounding effects and nitrate loading requirements for the proposed septic system density.
2) The applicant shall submit a Preliminary Water System Technical Report to the State Water Resources Control Board Division of Drinking Water (DDW) for review and approval at least 6 months before initiating construction of any water related improvement. In addition, a Technical, Managerial, and Financial (TMF) Assessment shall be submitted for the proposed public water system to the State Water Resources Control Board DDW.

The requested studies will be reviewed to determine if the proposed method of water supply and sewage disposal as proposed are feasible for the proposed project. The requested studies are not a guarantee that onsite septic systems or a public water well will be approved for project development by KCEH.

Printed on Recycled Paper

ATTACHMENT 2.

PRECIPITATION, EVAPORATION, AND EVAPOTRANSPIRATION DATA

Kern County

Average of Precipitation (inches)

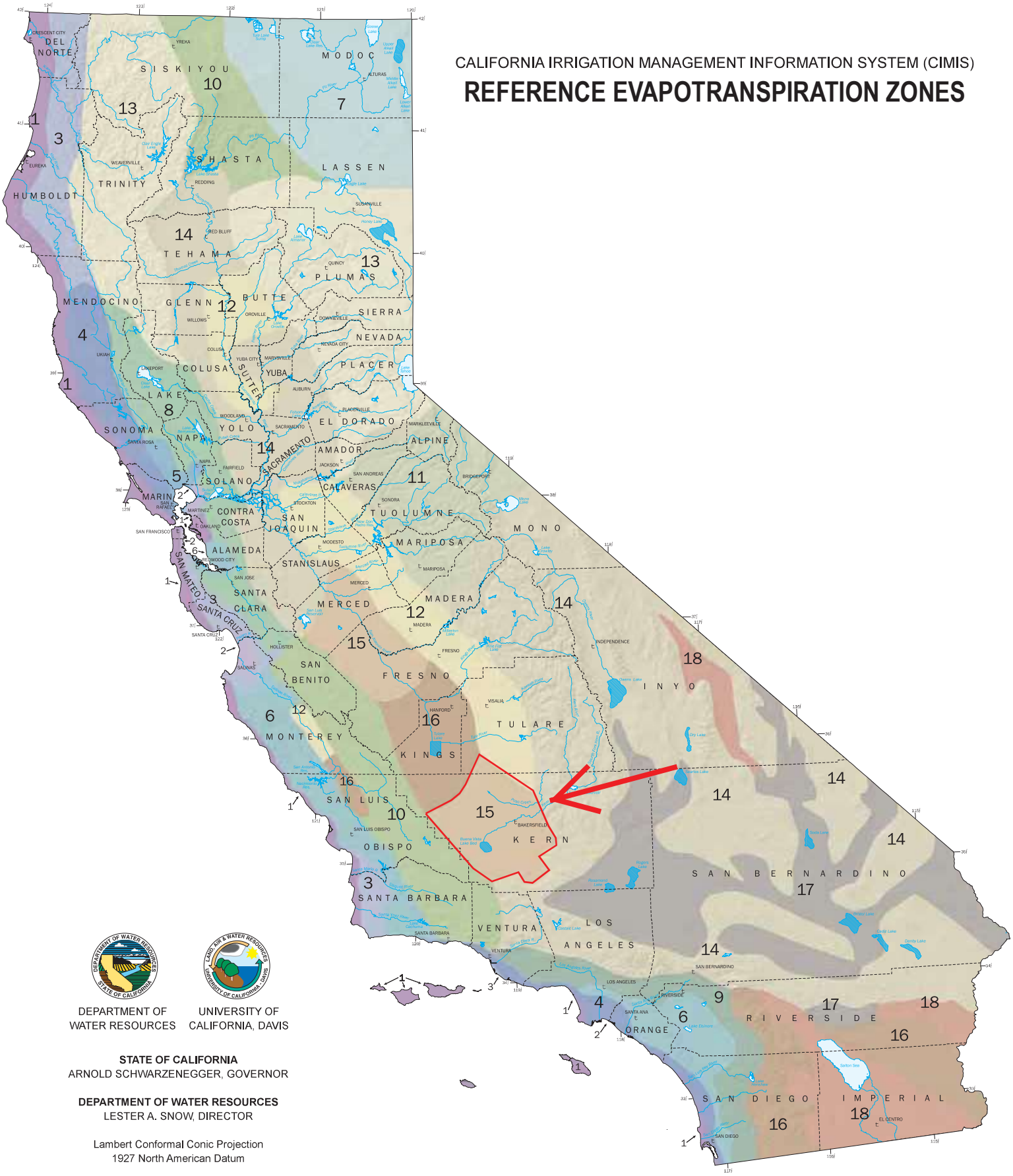
Average of Precip (i	Column Labels												
Row Labels	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average of Precip (inches)	
1916	3.16	0.22	1.28	0.32	0.08	0	0	0.07	0.51	1.16	0.25	1.81	0.738333333	8.86
1917	1.96	0.01	0.24	0.29	0.3	0	0	0	0	0.02	0.38	0.03	0.269166667	3.23
1918	0.54	2.9	2.69	0	0	0	0	0	0.54	0.27	1.38	1.06	0.781666667	9.38
1919	0.14	1.28	1.12	0.15	0.65	0	0	0	0.36	0.03	0.31	0.52	0.38	4.56
1920	0.57	1.88	2.27	0.13	0	0	0	0.02	0	0.16	0.34	0.67	0.503333333	6.04
1921	1.78	0.75	0.34	0.31	1.86	0	0	0	0.12	0.14	0.27	2.33	0.658333333	7.9
1922	2.63	1.31	1.68	0.24	0.44	0.1	0	0	0	0.23	0.66	1.02	0.6925	8.31
1923	0.9	0.33	0.12	1.43	0	0	0	0.01	0	0.47	0.34	0.55	0.345833333	4.15
1924	0.24	0.54	1.51	0.9	0.02	0	0	0	0	0.15	0.26	0.71	0.360833333	4.33
1925	0.45	0.48	1.41	0.92	0.56	0.27	0	0	0	0.33	0.47	0.77	0.471666667	5.66
1926	0.58	0.97	0.54	2.79	0.16	0	0	0	0	0.22	1.9	1.13	0.690833333	8.29
1927	0.91	1.8	1.46	0.19	0.07	0	0	0	0	1.34	0.44	0.55	0.563333333	6.76
1928	0.33	0.7	0.37	0.21	0.91	0	0	0	0	0.02	0.94	1.13	0.384166667	4.61
1929	0.62	0.39	0.85	0.5	0	0.11	0	0	0.06	0	0	0.1	0.219166667	2.63
1930	1.34	0.74	1.24	0.27	0.93	0	0	0	0.17	0.06	0.74	0	0.4575	5.49
1931	1.64	1.28	0.08	0.75	0.27	0.55	0	0	0	0.02	1.43	2.44	0.705	8.46
1932	1.32	1.82	0.25	0.37	0.25	0	0	0	0.22	0	0.1	1.09	0.451666667	5.42
1933	3.5	0.12	0.1	0.15	0.41	0.62	0	0	0	0.17	0	0.45	0.46	5.52
1934	0.41	1	0.16	0	0.23	0.22	0	0	0	0.88	1.62	1.61	0.510833333	6.13
1935	2.18	1.47	1.54	0.97	0	0	0	0.04	0	0.26	0.25	0.54	0.604166667	7.25
1936	0.33	3.43	0.98	0.34	0.32	0.18	0	0.02	0	1.44	0.02	2.58	0.803333333	9.64
1937	1.23	1.49	2.09	0.25	0	0	0	0	0	0.14	0.08	1.13	0.534166667	6.41
1938	1.35	2.15	3.65	1.16	0.15	0.01	0	0	0.09	0.12	0.04	1.2	0.826666667	9.92
1939	1.54	0.84	1.74	0.46	0.13	0	0	0	0.4	0.43	0.08	0.3	0.493333333	5.92
1940	1.84	2.39	0.54	1.1	0	0	0	0	0	0.98	0.15	1.85	0.7375	8.85
1941	1.63	2.68	2.18	2.2	0.21	0	0	0	0	0.83	0.33	2.79	1.070833333	12.85
1942	0.64	0.4	0.53	1.42	0.17	0	0	0.06	0	0.27	0.26	0.94	0.390833333	4.69
1943	2.91	1.26	1.63	1.21	0.1	0	0	0	0	0.16	0.2	1.03	0.708333333	8.5
1944	0.62	2.48	0.45	0.49	0.19	0	0	0	0	0.08	1.79	0.47	0.5475	6.57
1945	0.18	2.07	1.18	0.19	0.27	0.07	0	0	0	0.34	0.33	0.94	0.464166667	5.57
1946	0.3	0.92	1.42	0.29	0.32	0	0	0	0	0.29	1.97	1.27	0.565	6.78
1947	0.25	0.33	0.6	0.26	0.2	0	0	0	0	0.06	0.07	0.47	0.186666667	2.24
1948	0	0.69	1.18	1.03	0.22	0.12	0	0	0	0.02	0	0.98	0.353333333	4.24
1949	0.47	0.91	1.16	0.18	0.67	0	0	0	0	0.03	0.36	0.81	0.3825	4.59
1950	1.31	0.76	0.51	0.28	0.08	0	0	0	0.36	0.24	0.21	0.32	0.339166667	4.07
1951	1.45	0.5	0.25	0.79	0.06	0	0	0	0	0.08	0.35	1.45	0.410833333	4.93
1952	3	0.43	2.53	0.78	0	0	0	0	0.08	0	1.19	1.99	0.833333333	10
1953	0.7	0.18	0.36	0.82	0.34	0	0	0	0	0	1.07	0.07	0.295	3.54
1954	2.18	0.67	1.49	0.23	0	0	0	0	0	0	0.58	0.86	0.500833333	6.01
1955	2.27	0.77	0.14	0.5	0.85	0	0	0	0	0	0.55	1.3	0.531666667	6.38
1956	0.96	0.54	0	1.12	0.73	0	0	0	0	0.78	0	0.23	0.363333333	4.36
1957	1.52	0.85	0.83	0.83	0.48	0.23	0	0	0	0.45	0.63	0.89	0.559166667	6.71
1958	1.16	2.14	2.43	2.36	0.63	0	0	0	1	0	0.46	0.03	0.850833333	10.21

													Average of Precip (inches)	
Average of Precip (i	Column Labels													
Row Labels	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average of Precip (inches)	
1959	0.63	1.53	0	0.43	0.08	0	0	0	0.04	0	0	0.47	0.265	3.18
1960	1.1	1.42	0.33	0.67	0	0	0	0	0	0.23	2.84	0.05	0.553333333	6.64
1961	0.6	0.29	0.59	0.11	0.11	0	0	0.29	0	0	0.98	0.79	0.313333333	3.76
1962	0.95	5.44	0.46	0	0.14	0	0	0	0	0.15	0	0	0.595	7.14
1963	0.12	1.75	1.1	1.24	0.6	0.34	0	0.05	0.64	1.08	1.31	0.11	0.695	8.34
1964	0.58	0.15	0.59	0.55	0.24	0	0	0.06	0.14	0.81	0.76	0.56	0.37	4.44
1965	0.85	0.39	0.76	2.35	0	0	0.22	0.23	0.08	0	1.85	1.6	0.694166667	8.33
1966	0.77	1.01	0.09	0	0	0.04	0	0	0.11	0	1.3	1.48	0.4	4.8
1967	0.83	0.11	0.49	2.57	0.17	0.15	0	0	0.16	0	2.44	0.63	0.629166667	7.55
1968	0.44	0.83	0.86	0.4	0.06	0	0	0	0	1.31	0.53	0.83	0.438333333	5.26
1969	3.51	3.74	0.58	0.93	0.11	0.02	0.06	0	0	0.04	0.58	0.38	0.829166667	9.95
1970	0.91	0.97	1.2	0.37	0	0	0	0	0	0	2.51	0.97	0.5775	6.93
1971	0.46	0.36	0.21	0.62	1.23	0	0	0	0.03	0.06	0.18	1.99	0.428333333	5.14
1972	0.06	0.17	0	0.05	0.01	0.17	0	0	0	0.4	1.92	0.69	0.289166667	3.47
1973	2.31	1.47	2.12	0.03	0	0	0	0	0	0.31	0.66	0.67	0.630833333	7.57
1974	2.31	0.17	1.69	0.39	0	0	0	0	0	1.01	0.54	1.08	0.599166667	7.19
1975	0.05	1.31	1.36	0.84	0	0	0	0	0	0.51	0.24	0.24	0.379166667	4.55
1976	0.04	2.09	0.27	1.01	0.23	0.1	0	0	2.1	0.3	0.51	0.22	0.5725	6.87
1977	1	0.11	1.09	0	1.41	0.07	0	0.68	0	0	0.27	2.51	0.595	7.14
1978	1.68	4.83	3.7	1.64	0.15	0	0	0	1.38	0	0.67	0.8	1.2375	14.85
1979	2.21	2.28	2.09	0	0.06	0	0	0	0.02	0.46	0.29	0.48	0.6575	7.89
1980	2.53	1.75	1.77	0.98	0.43	0	0	0	0	0.06	0	0.21	0.644166667	7.73
1981	1.42	0.97	2.67	0.59	0.1	0	0	0	0	0.49	0.81	0.12	0.5975	7.17
1982	1.21	0.75	3.2	1.63	0	0.01	0	0.11	0.66	0.66	1.47	0.41	0.8425	10.11
1983	2.76	1.46	3	0.72	0.12	0	0	1.1	0.54	0.41	1.08	1.23	1.035	12.42
1984	0.23	0.38	0.33	0.42	0	0.04	0.08	0	0.07	0.18	1.43	1.57	0.394166667	4.73
1985	0.81	0.69	0.65	0.07	0	0.25	0	0	0.63	0.17	1.57	0.48	0.443333333	5.32
1986	0.92	1.32	1.63	0.84	0.16	0	0	0	0.04	0.04	0.8	0.56	0.525833333	6.31
1987	1.9	0.95	1.19	0.1	0.1	0.13	0	0	0	0.51	2.31	1.16	0.695833333	8.35
1988	1.17	0.35	0.55	1.85	0.07	0.17	0	0	0	0	0.24	1.49	0.490833333	5.89
1989	0.4	1.37	0.45	0.07	0.23	0	0	0	0.59	0.06	0	0.03	0.266666667	3.2
1990	1.09	0.9	0.12	0.22	0.36	0	0	0.02	0.02	0	0.22	0.13	0.256666667	3.08
1991	0.58	0.32	5.78	0.07	0.02	0	0	0	0	0.26	0	1.03	0.671666667	8.06
1992	1.5	2.77	1.59	0.06	0	0	0.19	0	0	0.42	0	1.54	0.6725	8.07
1993	2.69	2.39	1.82	0.05	0.04	0.53	0	0	0	0.29	0.64	0.49	0.745	8.94
1994	1	1.35	0.78	0.56	0.86	0	0	0	0.32	0.16	1.21	1.31	0.629166667	7.55
1995	3.76	1.01	4.32	0.62	0.58	0.16	0	0	0	0	0.11	1.09	0.970833333	11.65
1996	0.78	3.18	0.52	0.15	0.03	0.03	0.02	0	0	1.13	1.09	1.95	0.74	8.88
1997	2.01	0.45	0.14	0.02	0.01	0	0	0	0.05	0.21	1.28	1.27	0.453333333	5.44
1998	1.26	6.17	2.6	0.96	2.58	0.4	0	0	0.26	0.36	0.76	0.63	1.331666667	15.98
1999	2.81	0.43	0.83	0.99	0	0	0	0	0.08	0	0.2	0.16	0.458333333	5.5
2000	1.04	1.98	1.16	0.83	0	0.07	0	0	0	0.62	0	0	0.475	5.7
2001	1.99	2.48	1.23	0.67	0	0	0.01	0	0	0.16	0.98	0.72	0.686666667	8.24
2002	0.57	0.11	0.38	0.7	0.08	0	0	0	0.02	0	0.91	1.12	0.324166667	3.89

Average of Precip (inches)														
Average of Precip (i	Column Labels													
Row Labels	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average of Precip (inches)	
2003	0.1	1.76	0.71	1.2	0.41	0	0.06	0.18	0	0	0.5	1.27	0.515833333	6.19
2004	0.54	1.57	0.29	0.07	0	0	0	0	0	1.5	0.32	1.41	0.475	5.7
2005	2.75	1.45	1.03	0.77	1.03	0	0	0	0.07	0.44	0.1	0.57	0.684166667	8.21
2006	1.85	0.17	1.81	1.91	0.15	0	0	0	0	0.37	0.14	0.37	0.564166667	6.77
2007	0.45	0.74	0.37	0.36	0	0	0	0	0.12	0.22	0.07	0.49	0.235	2.82
2008	1.42	0.25	0.08	0.06	0.1	0	0	0	0	0.02	0.94	0.69	0.296666667	3.56
2009	0.42	1.38	0.3	0.11	0.25	0	0	0.04	0	0.05	0.16	1.18	0.324166667	3.89
2010	2.18	1.49	0.26	0.94	0.09	0	0	0	0	1.08	0.64	5.35	1.0025	12.03
2011	0.52	0.37	1.68	0.13	0.39	0.22	0	0	0.04	0.38	0.94	0.02	0.390833333	4.69
2012	0.33	0.33	1.22	1.45	0	0	0	0	0	0.01	0.19	0.89	0.368333333	4.42
2013	0.51	0.29	0.8	0.07	0.13	0	0	0	0	0	0.54	0.11	0.204166667	2.45
2014	0.05	0.46	0.81	0.41	0.03	0	0	0	0	0	0.58	2.06	0.366666667	4.4
2015	0.36	0.49	0.34	0.08	0.34	0.29	0.55	0	0.07	0.55	0.63	0.55	0.354166667	4.25
2016	1.66	1.04	0.78	0.85	0.37	0	0	0	0	0.35	0.49	1.53	0.589166667	7.07
Average of Precip (i	**1.20811881**	**1.233762376**	**1.127623762**	**0.643168317**	**0.266534653**	**0.056138614**	**0.011782178**	**0.02950495**	**0.120693069**	**0.301980198**	**0.658712871**	**0.932178218**	**0.549183168**	6.590198

CALIFORNIA IRRIGATION MANAGEMENT INFORMATION SYSTEM (CIMIS)

REFERENCE EVAPOTRANSPIRATION ZONES



DEPARTMENT OF WATER RESOURCES

UNIVERSITY OF CALIFORNIA, DAVIS

STATE OF CALIFORNIA
ARNOLD SCHWARZENEGGER, GOVERNOR

DEPARTMENT OF WATER RESOURCES
LESTER A. SNOW, DIRECTOR

Lambert Conformal Conic Projection
1927 North American Datum

Reference EvapoTranspiration (ETo) Zones

1 **COASTAL PLAINS HEAVY FOG BELT** lowest ETo in California, characterized by dense fog

2 **COASTAL MIXED FOG AREA** less fog and higher ETo than zone 1

3 **COASTAL VALLEYS & PLAINS & NORTH COAST MOUNTAINS** more sunlight than zone 2

4 **SOUTH COAST INLAND PLAINS & MOUNTAINS NORTH OF SAN FRANCISCO** more sunlight and higher summer ETo than zone 3

5 **NORTHERN INLAND VALLEYS** valleys north of San Franciaco

6 **UPLAND CENTRAL COAST & LOS ANGELES BASIN** higher elevation coastal areas

7 **NORTHEASTERN PLAINS**

8 **INLAND SAN FRANCISCO BAY AREA** inland area near San Francisco with some marine influence

9 **SOUTH COAST MARINE TO DESERT TRANSITION** inland area between marine & desert climates

10 **NORTH CENTRAL PLATEAU & CENTRAL COAST RANGE** cool, high elevation areas with strong summer sunlight; zone has limited climate data & the zones selection is somewhat subjective

11 **CENTRAL SIERRA NEVADA** mountain valleys east of Sacramento with some influence from delta breeze in summer

12 **EAST SIDE SACRAMENTO-SAN JOAQUIN VALLEY** low winter & high summer ETo with slightly lower ETo than zone 14

13 **NORTHERN SIERRA NEVADA** northern Sierra Nevada mountain valleys with less marine influence than zone 11

14 **MID-CENTRAL VALLEY, SOUTHERN SIERRA NEVADA, TEHACHAPI & HIGH DESERT MOUNTAINS** high summer sunshine and wind in some locations

15 **NORTHERN & SOUTHERN SAN JOAQUIN VALLEY** slightly lower winter ETo due to fog and slightly higher summer ETo than zones 12 & 14

16 **WESTSIDE SAN JOAQUIN VALLEY & MOUNTAINS EAST & WEST OF IMPERIAL VALLEY**

17 **HIGH DESERT VALLEYS** valleys in the high desert near Nevada and Arizona

18 **IMPERIAL VALLEY, DEATH VALLEY & PALO VERDE** low desert areas with high sunlight & considerable heat advection

Monthly Average Reference Evapotranspiration by ETo Zone (inches/month)

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	0.93	1.40	2.48	3.30	4.03	4.50	4.65	4.03	3.30	2.48	1.20	0.62	32.9
2	1.24	1.68	3.10	3.90	4.65	5.10	4.96	4.65	3.90	2.79	1.80	1.24	39.0
3	1.86	2.24	3.72	4.80	5.27	5.70	5.58	5.27	4.20	3.41	2.40	1.86	46.3
4	1.86	2.24	3.41	4.50	5.27	5.70	5.89	5.58	4.50	3.41	2.40	1.86	46.6
5	0.93	1.68	2.79	4.20	5.58	6.30	6.51	5.89	4.50	3.10	1.50	0.93	43.9
6	1.86	2.24	3.41	4.80	5.58	6.30	6.51	6.20	4.80	3.72	2.40	1.86	49.7
7	0.62	1.40	2.48	3.90	5.27	6.30	7.44	6.51	4.80	2.79	1.20	0.62	43.3
8	1.24	1.68	3.41	4.80	6.20	6.90	7.44	6.51	5.10	3.41	1.80	0.93	49.4
9	2.17	2.80	4.03	5.10	5.89	6.60	7.44	6.82	5.70	4.03	2.70	1.86	55.1
10	0.93	1.68	3.10	4.50	5.89	7.20	8.06	7.13	5.10	3.10	1.50	0.93	49.1
11	1.55	2.24	3.10	4.50	5.89	7.20	8.06	7.44	5.70	3.72	2.10	1.55	53.1
12	1.24	1.96	3.41	5.10	6.82	7.80	8.06	7.13	5.40	3.72	1.80	0.93	53.4
13	1.24	1.96	3.10	4.80	6.51	7.80	8.99	7.75	5.70	3.72	1.80	0.93	54.3
14	1.55	2.24	3.72	5.10	6.82	7.80	8.68	7.75	5.70	4.03	2.10	1.55	57.0
15	1.24	2.24	3.72	5.70	7.44	8.10	8.68	7.75	5.70	4.03	2.10	1.24	57.9
16	1.55	2.52	4.03	5.70	7.75	8.70	9.30	8.37	6.30	4.34	2.40	1.55	62.5
17	1.86	2.80	4.65	6.00	8.06	9.00	9.92	8.68	6.60	4.34	2.70	1.86	66.5
18	2.48	3.36	5.27	6.90	8.68	9.60	9.61	8.68	6.90	4.96	3.00	2.17	71.6

Variability between stations within single zones is as high as 0.02 inches per day for zone 1 and during winter months in zone 13. The average standard deviation of the ETo between estimation sites wihtin a zone for all months is about 0.01 inches per day for the 200 sites used to develop the map.

ATTACHMENT 3.

CV SALTS AND USGS GAMA NITRATES IN GROUNDWATER DATA

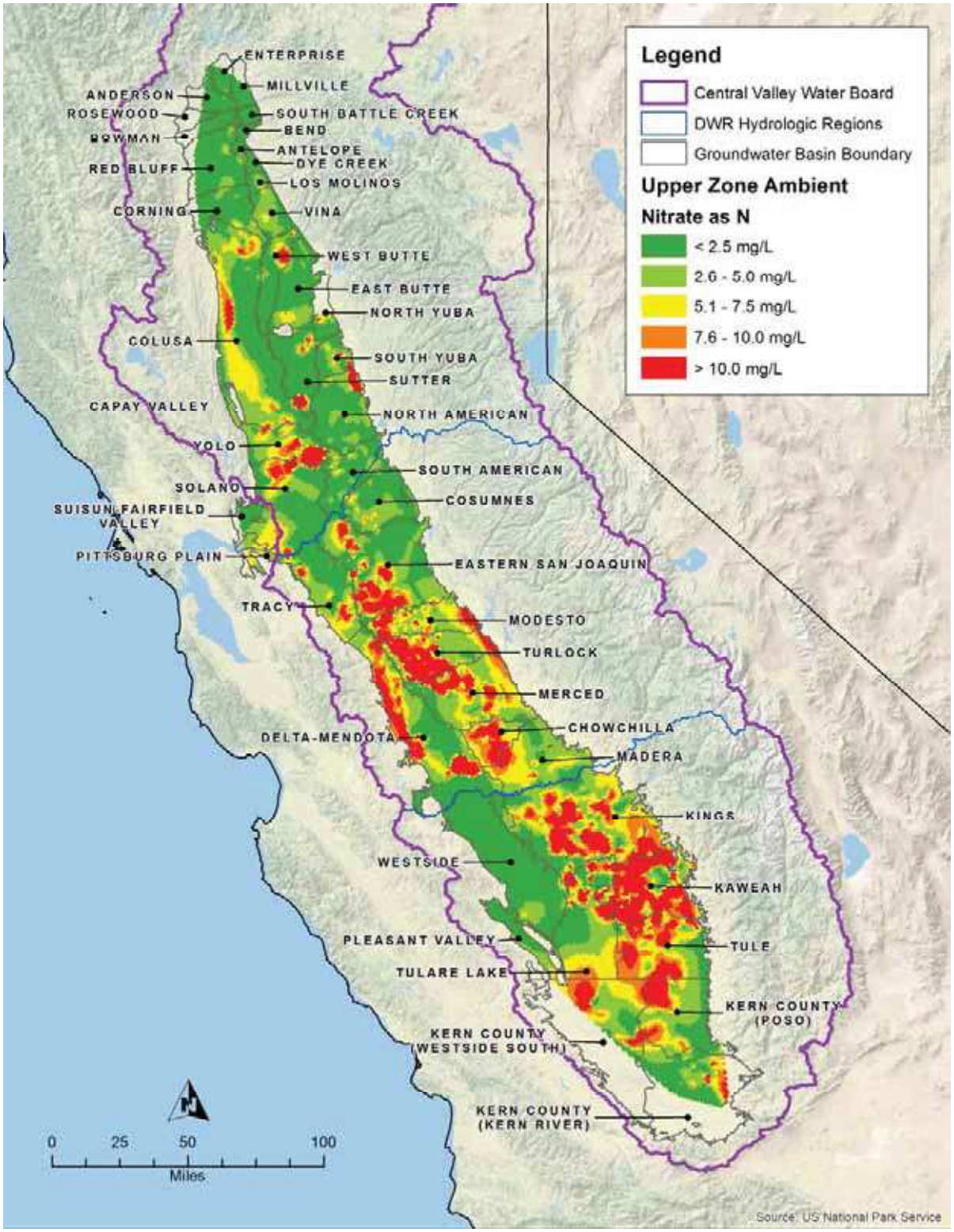


Figure 3-23. Ambient Conditions for Nitrate (mg/L as N) in the Upper Zone of Groundwater Basins/Subbasins in the Central Valley Floor.

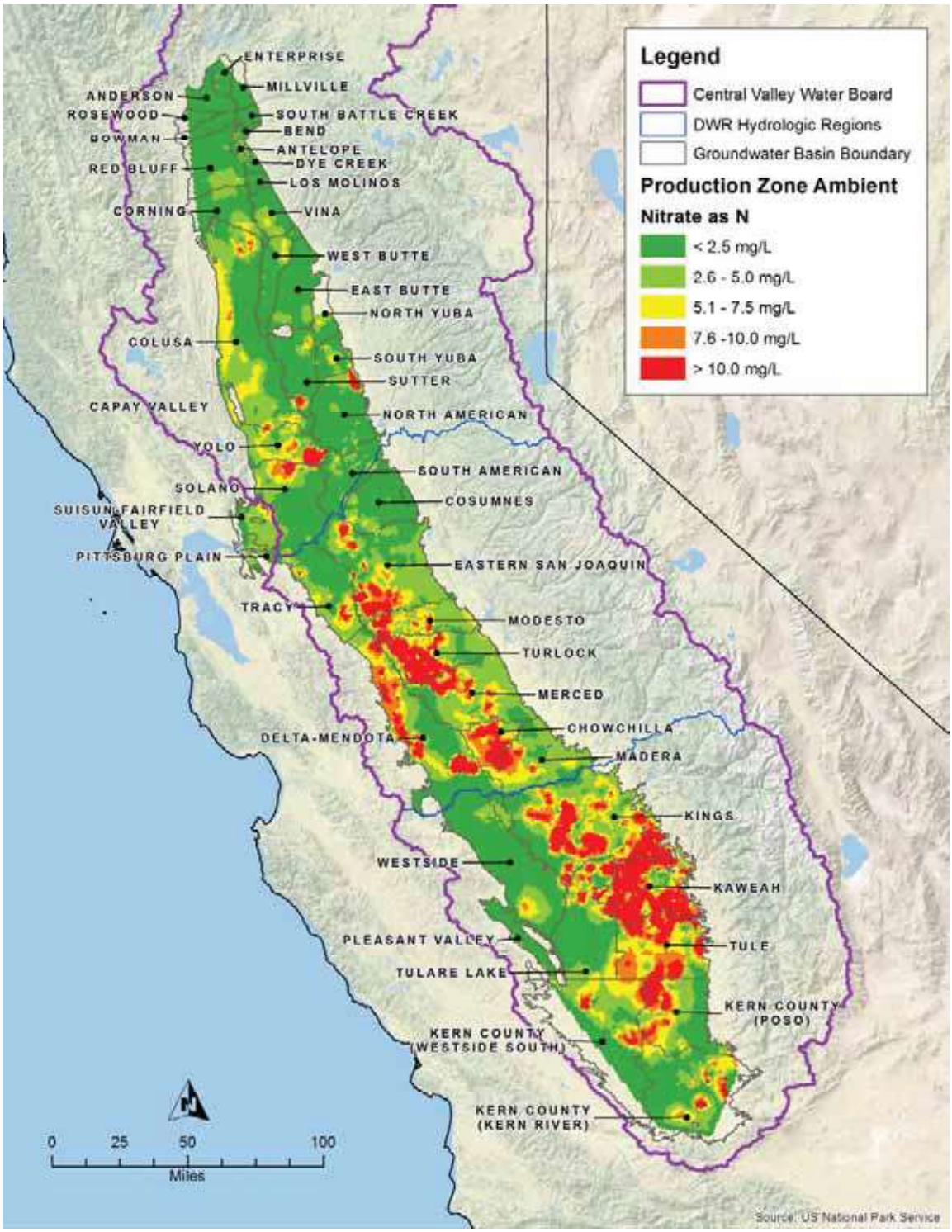


Figure 3-24. Ambient Conditions for Nitrate (mg/L as N) in the Production Zone of Groundwater Basins/Subbasins in the Central Valley Floor (above Corcoran Clay where present).

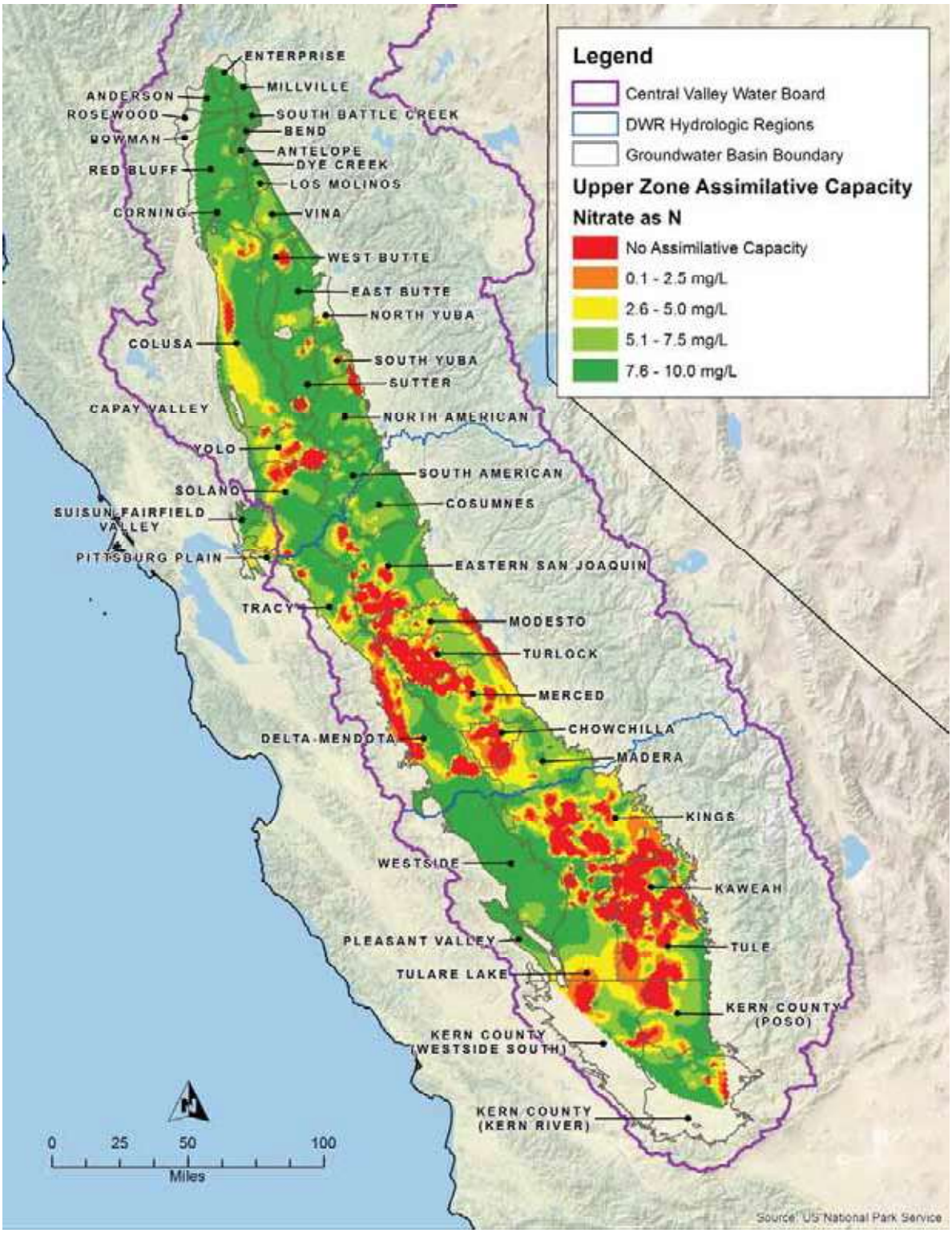


Figure 3-28. Estimated Assimilative Capacity for Nitrate (mg/L as N) in the Upper Zone of Central Valley Floor Groundwater Basins/Subbasins.

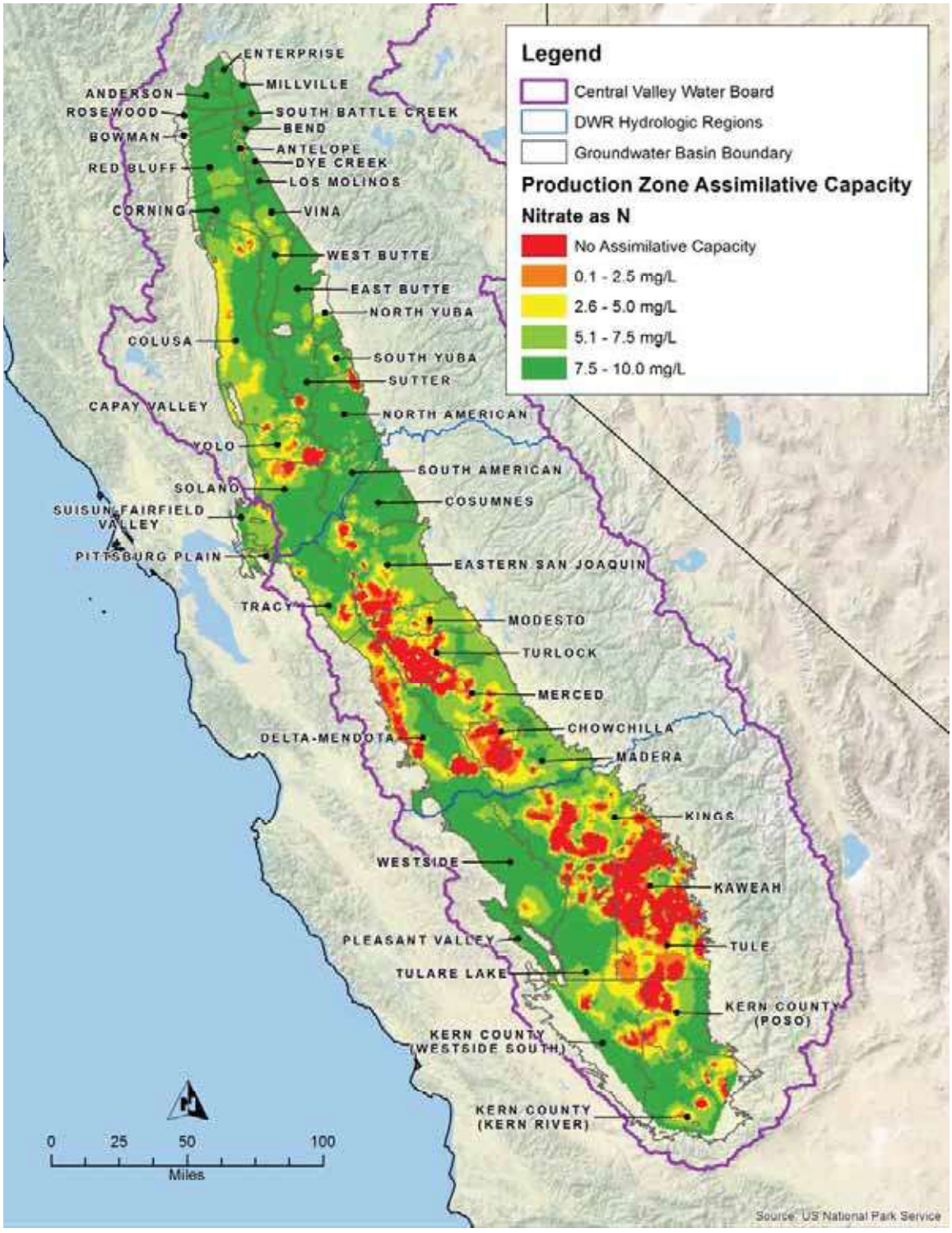


Figure 3-29. Estimated Assimilative Capacity for Nitrate (mg/L as N) in the Production Zone of Central Valley Floor Groundwater Basins/Subbasins (above Corcoran Clay where present).

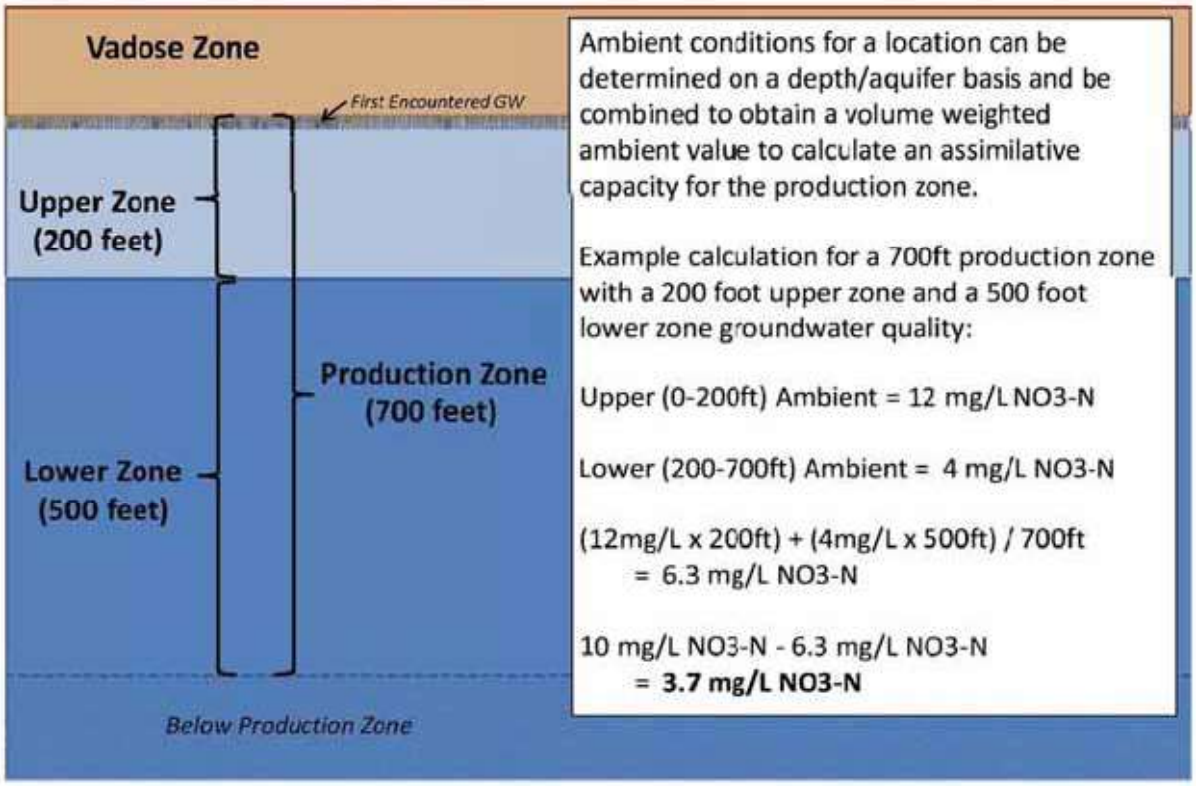


Figure 3-27. Illustration of How Assimilative Capacity is Estimated for Groundwater Zones.

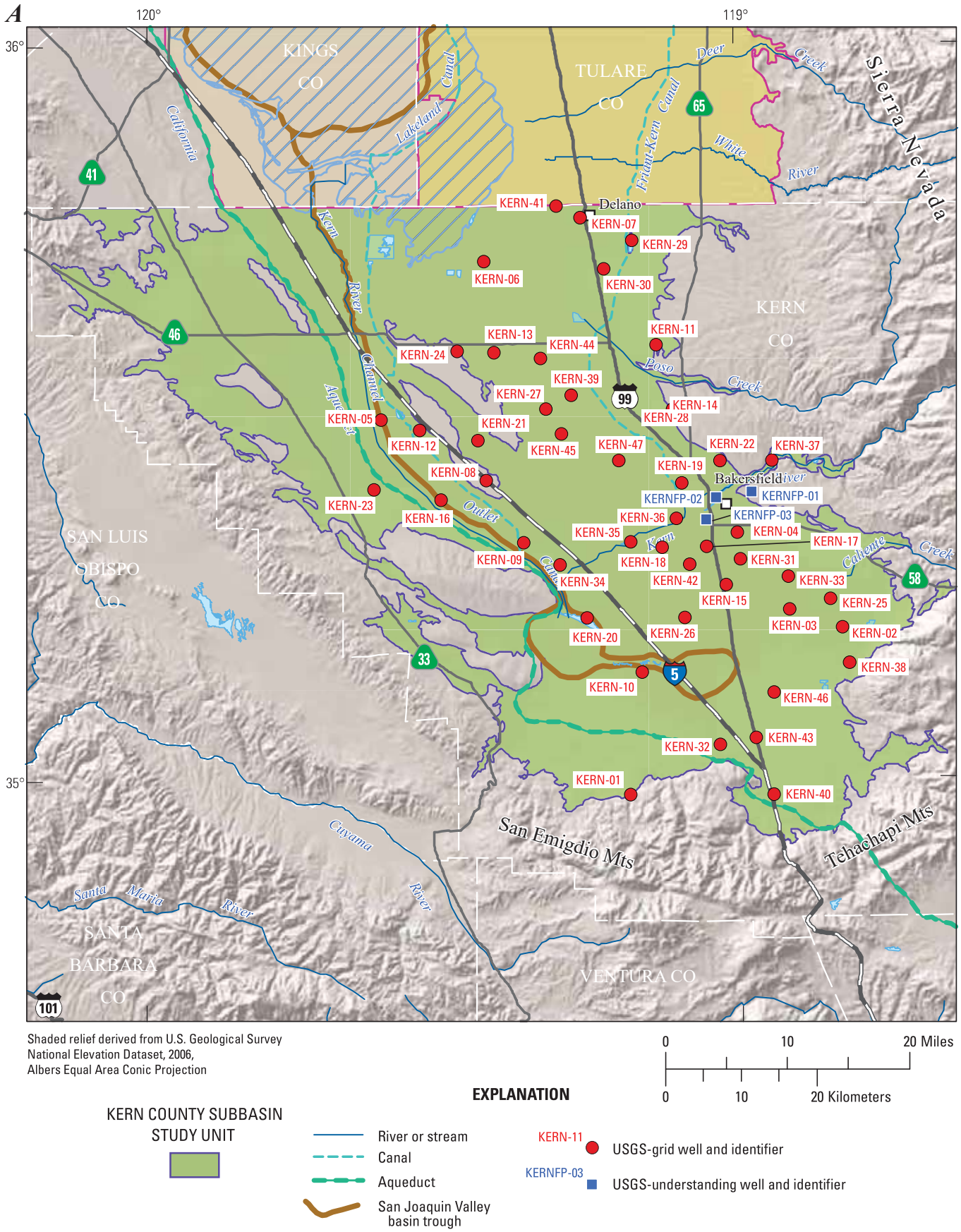
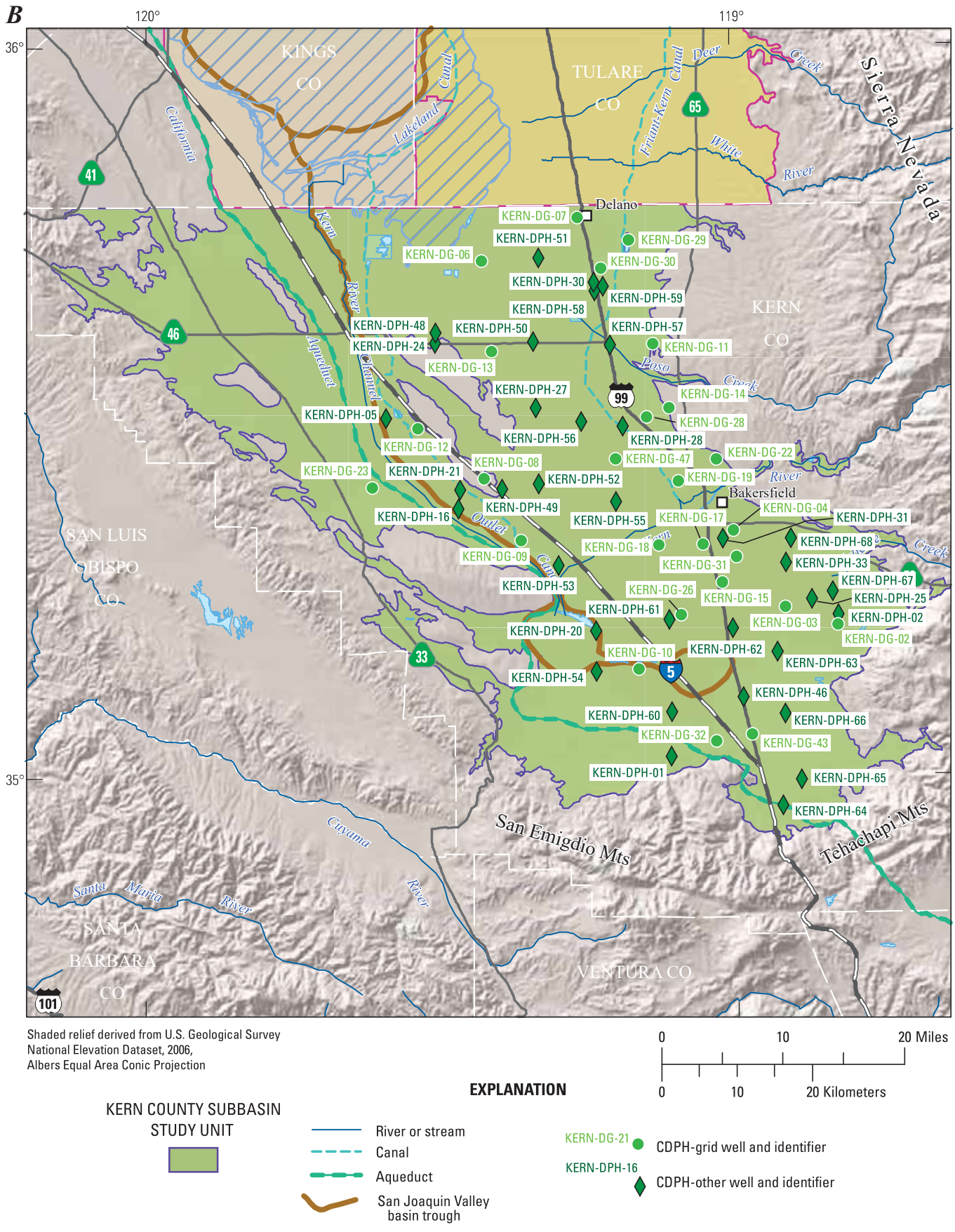


Figure A2. Identifiers and locations of (*A*) USGS-grid and USGS-understanding wells sampled during January through March 2006 and (*B*) CDPH-grid wells using data for inorganic constituents from the California Department of Public Health (CDPH), Kern County Subbasin study unit, southern San Joaquin Valley, California GAMA Priority Basin Project.



Shaded relief derived from U.S. Geological Survey National Elevation Dataset, 2006, Albers Equal Area Conic Projection

0 10 20 Miles
0 10 20 Kilometers

EXPLANATION

KERN COUNTY SUBBASIN STUDY UNIT

River or stream

Canal

Aqueduct

San Joaquin Valley basin trough

KERN-DG-21 CDPH-grid well and identifier

KERN-DPH-16 CDPH-other well and identifier

Figure A2—Continued

Table D8. Oxidation-reduction classification and pH for USGS-grid and USGS-understanding wells, Kern County Subbasin study unit, California GAMA Priority Basin Project.

[Redox category and redox process determined using the algorithm of McMahon and Chapelle (2008) implemented by Jurgens and others (2009b) except for samples with incomplete redox data, which were excluded from the analysis. **Abbreviations**: USGS, U.S. Geological Survey; GAMA, Groundwater Ambient Monitoring and Assessment Program; mg/L, milligram per liter; µg/L, microgram per liter; redox, oxidation-reduction; KERN, Kern County Subbasin well; FP, flow-path well; nc, not collected; <, less than; –, not detected; ≥, greater than or equal to; oxic, dissolved oxygen ≥ 0.5; suboxic, dissolved oxygen < 0.5; anoxic-NO_3, nitrate reducing; anoxic-Mn, manganese reducing; anoxic-Fe, iron reducing; O_2, oxygen; Fe(III), iron oxide; SO_4, sulfate; NO_3, nitrate; Mn(IV), manganese oxide]

USGS GAMA well identification number	pH	Oxidizing and reducing constituents					Redox category	Redox process
		Dissolved oxygen (mg/L)	Nitrate plus nitrite (mg/L)	Manganese (µg/L)	Iron (µg/L)	Sulfate (mg/L)		
Grid wells								
KERN-01	nc	7.5	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-02	nc	3.9	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-03	8.2	1.9	6.10	–	–	100	Oxic	O_2
KERN-04	8.1	1.1	1.04	–	–	20	Oxic	O_2
KERN-05	nc	1.8	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-06	nc	3.9	4.29	–	–		$O_2 \geq 0.5$ mg/L	Unknown
KERN-07	8.2	1.4	8.81	–	–	63	Oxic	O_2
KERN-08	nc	<0.2	–	nc	nc	nc	Suboxic	Unknown
KERN-09	6.8	2.1	1.94	–	–	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-10	8.13	<0.2	<0.10	12	230	554	Anoxic	Fe(III)/SO_4
KERN-11	nc	5.6	4.29	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-12	nc	1.8	1.54	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-13	8.6	7.7	3.16	–	–	62	Oxic	O_2
KERN-14	8.3	<0.2	–	58	1,800	2.3	Anoxic	Fe(III)
KERN-15	7.8	1.7	2.60	10	100	26	Mixed (oxic-anoxic)	O_2-SO_4
KERN-16	nc	0.3	nc	nc	nc	nc	Suboxic	Unknown
KERN-17	8.0	5.4	0.38	–	–	22	Oxic	O_2
KERN-18	8.2	6.6	0.69	0.19	18.8	11.4	Oxic	O_2
KERN-19	9.3	<0.2	0.01	–	–	64	Suboxic	Suboxic
KERN-20	nc	6.4	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-21	nc	5.7	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-22	8.5	1.1	3.73	–	–	91	Oxic	O_2
KERN-23	nc	0.5	–	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-24	nc	3.6	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-25	nc	1.9	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-26	7.7	0.8	–	–	–	44	Mixed (oxic-anoxic)	O_2-Fe(III)-SO_4
KERN-27	nc	6.9	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-28	nc	0.2	nc	nc	nc	nc	Suboxic	Unknown
KERN-29	nc	5.0	–	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-30	nc	8.4	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-31	nc	4.9	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-32	8.1	<0.2	–	22	60	426	Suboxic	Suboxic
KERN-33	nc	1.1	nc	nc	nc	nc	$O_2 \geq 0.5$ mg/L	Unknown
KERN-34	8.0	7.8	1.92	–	–	34	Oxic	O_2
KERN-35	8.1	5.8	1.04	–	–	23.7	Oxic	O_2
KERN-36	8.5	3.0	1.12	0.2	–	38.8	Oxic	O_2
KERN-37	7.7	2.4	0.36	2.6	8	28.3	Oxic	O_2
KERN-38	7.7	4.0	13.4	0.7	–	131	Oxic	O_2
KERN-39	7.9	7.8	12.4	0.3	–	120	Oxic	O_2
KERN-40	7.8	0.2	2.78	6.3	22	779	Anoxic	NO_3
KERN-41	9.6	0.5	3.38	0.5	13	39.7	Oxic	O_2
KERN-42	8.4	1.5	0.55	0.5	–	12.1	Oxic	O_2
KERN-43	7.7	<0.2	0.54	1.2	–	43.4	Anoxic	NO_3
KERN-44	8.0	9.0	8.50	–	–	30.3	Oxic	O_2

Table D8. Oxidation-reduction classification and pH for USGS-grid and USGS-understanding wells, Kern County Subbasin study unit, California GAMA Priority Basin Project.—Continued

[Redox category and redox process determined using the algorithm of McMahon and Chapelle (2008) implemented by Jurgens and others (2009b) except for samples with incomplete redox data, which were excluded from the analysis. **Abbreviations**: USGS, U.S. Geological Survey; GAMA, Groundwater Ambient Monitoring and Assessment Program; mg/L, milligram per liter; µg/L, microgram per liter; redox, oxidation-reduction; KERN, Kern County Subbasin well; FP, flow-path well; nc, not collected; <, less than; –, not detected; ≥, greater than or equal to; oxic, dissolved oxygen ≥ 0.5; suboxic, dissolved oxygen < 0.5; anoxic-NO_3, nitrate reducing; anoxic-Mn, manganese reducing; anoxic-Fe, iron reducing; O_2, oxygen; Fe(III), iron oxide; SO_4, sulfate; NO_3, nitrate; Mn(IV), manganese oxide]

USGS GAMA well identification number	pH	Oxidizing and reducing constituents					Redox category	Redox process
		Dissolved oxygen (mg/L)	Nitrate plus nitrite (mg/L)	Manganese (µg/L)	Iron (µg/L)	Sulfate (mg/L)		
Grid wells—Continued								
KERN-45	9.1	3.0	2.04	–	13	95.5	Oxic	O_2
KERN-46	7.6	<0.2	7.45	69.3	–	579	Mixed (anoxic)	NO_3-Mn(IV)
KERN-47	8.7	5.4	4.48	0.4	10	161	Oxic	O_2
Understanding wells								
KERNFP-01	8.0	<0.2	–	80.3	31	147	Anoxic	Mn(IV)
KERNFP-02	7.9	<0.2	0.07	1.3	7	21.1	Suboxic	Suboxic
KERNFP-03	7.1	4.0	0.46	6.9	–	20.3	Oxic	O_2